

PROCEEDINGS  
OF THE  
AMERICAN SOCIETY  
OF  
CIVIL ENGINEERS  
(INSTITUTED 1852)

---

VOL. XLI—No. 6

AUGUST, 1915

---

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that the full title of Paper, name of Author, page reference, and date of presentation to the Society, are given.

---

CONTENTS

Society Affairs.....	Pages 397 to 590.
Papers and Discussions.....	Pages 1293 to 1700.

---

NEW YORK 1915

Entered according to Act of Congress, in the year 1915, by the AMERICAN SOCIETY OF CIVIL ENGINEERS, in the office of the Librarian of Congress, at Washington.

# American Society of Civil Engineers

## OFFICERS FOR 1915

President, CHARLES D. MARX

Vice-Presidents

Term expires January, 1916:

CHARLES F. LOWETH  
GARDNER S. WILLIAMS

Term expires January, 1917:

DANIEL BONTECOU  
CLEMENS HERSCHEL

Secretary, CHARLES WARREN HUNT

Treasurer, LINCOLN BUSH

Directors

Term expires January,  
1916:

JAMES H. EDWARDS  
HENRY W. HODGE  
LEONARD METCALF  
HENRY R. LEONARD  
EDWARD H. CONNOR  
SAMUEL H. HEDGES

Term expires January,  
1917:

GEORGE W. FULLER  
ARTHUR S. TUTTLE  
CHARLES H. KEEFER  
MORTIMER E. COOLEY  
EUGENE E. HASKELL  
RICHARD MONTFORT

Term expires January,  
1918:

JOHN V. DAVIES  
GEORGE A. HARWOOD  
J. E. GREINER  
JOHN F. COLEMAN  
JOHN B. HAWLEY  
HERBERT S. CROCKER

Assistant Secretary, T. J. McMINN

## Standing Committees

(THE PRESIDENT OF THE SOCIETY IS *ex-officio* MEMBER OF ALL COMMITTEES)

On Finance:

HENRY W. HODGE  
CLEMENS HERSCHEL  
GEORGE W. FULLER  
LEONARD METCALF  
JOHN F. COLEMAN

On Publications:

JAMES H. EDWARDS  
ARTHUR S. TUTTLE  
J. E. GREINER  
HENRY R. LEONARD  
GARDNER S. WILLIAMS

On Library:

GEORGE A. HARWOOD  
JOHN V. DAVIES  
HERBERT S. CROCKER  
M. E. COOLEY  
CHAS. WARREN HUNT

## Special Committees

ON CONCRETE AND REINFORCED CONCRETE: Joseph R. Worcester, J. E. Greiner, W. K. Hatt, Olaf Hoff, Richard L. Humphrey, Robert W. Lesley, Emil Swensson, A. N. Talbot.

ON ENGINEERING EDUCATION: Desmond FitzGerald, Onward Bates, D. W. Mead.

ON STEEL COLUMNS AND STRUTS: —————\* James H. Edwards, Charles F. Loweth, Rudolph P. Miller, Ralph Modjeski, Frank C. Osborn, George H. Pegram, Lewis D. Rights, George F. Swain, Emil Swensson, Joseph R. Worcester.

ON MATERIALS FOR ROAD CONSTRUCTION: W. W. Crosby, A. W. Dean, H. K. Bishop, A. H. Blanchard, George W. Tillson, Nelson P. Lewis, Charles J. Tilden.

ON VALUATION OF PUBLIC UTILITIES: Frederic P. Stearns, Charles S. Churchill, Leonard Metcalf, William G. Raymond, Henry E. Riggs, Jonathan P. Snow, William J. Wilgus.

TO INVESTIGATE CONDITIONS OF EMPLOYMENT OF, AND COMPENSATION OF, CIVIL ENGINEERS: Nelson P. Lewis, S. L. F. Deyo, Dugald C. Jackson, William V. Judson, George W. Tillson, C. F. Loweth, John A. Bensel.

TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, Edwin Duryea, Jr., E. G. Haines, Allen Hazen, James C. Meem, Walter J. Douglas.

ON A NATIONAL WATER LAW: F. H. Newell, George G. Anderson, Charles W. Comstock, Clemens Herschel, W. C. Hoad, Robert E. Horton, John H. Lewis, Charles D. Marx, Gardner S. Williams.

ON FLOODS AND FLOOD PREVENTION: C. McD. Townsend, John A. Bensel, T. G. Dabney, C. E. Grunsky, Morris Knowles, J. B. Lippincott, Daniel W. Mead, John A. Ockerson, Arthur T. Safford, Charles Saville, F. L. Sellow.

TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, J. B. Berry, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Robert W. Hunt, George W. Kittredge, Paul M. LaBach, C. G. E. Larsson, William McNab, G. J. Ray, Albert F. Reichmann, F. E. Turneure, J. E. Willoughby.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER.....1446 Circle.

CABLE ADDRESS....."Ceas, New York."

\* Vacancy in chairmanship caused by the death of Austin Lord Bowman.

## AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

## PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed  
in its publications.

## SOCIETY AFFAIRS

## CONTENTS

	PAGE
Minutes of Meetings:	
Of the Society, May 19th and June 2d, 1915.....	397
Elections and Transfers by the Board of Direction, June 3d and July 7th, 1915....	400
Of the Board of Direction, July 6th-7th, 1915.....	404
Society Items of Interest.....	405
Announcements:	
Hours during which the Society House is open.....	407
Future Meetings.....	407
Annual Convention.....	407
Searches in the Library.....	408
Papers and Discussions.....	408
Local Associations of Members of the American Society of Civil Engineers .....	409
Minutes of Meetings of Special Committees.....	416
Privileges of Engineering Societies Extended to Members.....	422
Accessions to the Library:	
Donations.....	425
By purchase.....	426
Membership (Additions, Changes of Address, Resignations, Deaths).....	429
Recent Engineering Articles of Interest.....	462

## MINUTES OF MEETINGS OF THE SOCIETY

**May 19th, 1915.**—The meeting was called to order at 8.30 P. M.; George H. Pegram, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 197 members and 46 guests.

A paper by J. D. Galloway, M. Am. Soc. C. E., entitled "The Design of Hydro-Electric Power Plants", was presented by the Secretary.

T. Kennard Thomson, M. Am. Soc. C. E., delivered an address on "The Evolution of Manhattan Island from an Indian Village to a Great Metropolis", illustrating his remarks with lantern slides. H. de B. Parsons, M. Am. Soc. C. E., also presented a number of lantern slides illustrating the development of bridges, steamships, and locomotives.

The Secretary presented the following letter:

"NORTH EGREMONT, MASS., May 17/15.

"MR. CHAS. WARREN HUNT

"Secretary, AM. SOC. C. E.

"220 West 57th St.

"New York.

"DEAR MR. HUNT.—Upon my return here I find the inclosed relating to the Contest in Illinois relating to the Bill for Licensing Structural Engineers—which the Engineers, members of the Western Society of Engineers, have introduced in the Illinois Legislature to protect the Profession there from the effects of an Architect's License Bill, now a Law, prohibiting Structural Civil Engineers from practicing under their own names *without an Architect's License*.

"This is a matter in which Structural Engineers of the American Soc. C. E. are vitally interested. As you see from the list of members of the Legislative Committee eleven of the twenty-five are prominent members of the Am. Soc. C. E.

"As Past-President of the Western Soc. of Engineers—and Past-Vice-President of the Am. Soc. C. E.—I feel it my duty on behalf of these two Societies and of the Engineering Profession to bring this important matter to your attention—and to ask you to bring it to the attention of the meeting next Wednesday night if business matters are permissible there—and to ask the members present to assist in the passage of the Engineers' Bill if they know any members of the Legislature or can reach any through their friends in Illinois.

"While we generally here are opposed to *any* License Law the Civil Engineers of Illinois are obliged to have one in order to prevent the application of the Architects' Law to them which would be fatal to their professional work and standing.

"I am yours respectfully,

"E. L. CORTHELL."

The Secretary stated that it was not necessary for the meeting to take any action as the whole matter was in the hands of a committee of the Board of Direction, of which Mr. Charles L. Strobel is chairman.

Richard S. Buck, M. Am. Soc. C. E., introduced the following resolution:

"Whereas, The United States is, by reason of the European War, faced by what may at any moment become the most serious crisis in its history; and

"Whereas, A persistent adherence to a policy of peace and of greatly restricted preparation for war requires, in order to meet this crisis, spontaneous, harmonious, and diligent action on the part of all classes of the body politic; and

"Whereas, Effective preparation for meeting this crisis will especially demand prompt, efficient, and economical organization, not only for creative work on a gigantic scale and of great variety, but also for bringing into existence an enormous and capable fighting force; and

"Whereas, The Corps of Engineers and other branches of the Army and Navy, albeit of the highest grade, may be utterly lacking in numbers to meet the impending demands; and



"Whereas, It may be necessary, in order to achieve success or escape disaster, to create rapidly from raw material a large, many sided fighting force, covering widely scattered territory; and

"Whereas, The membership of the American Society of Civil Engineers is nearly 8 000, and includes men seasoned in all lines of organization, creative and constructive work, and men of all grades of capability and experience in such work; and who are closely in touch with the great body of workers from whom the best grades of the rank and file of all branches of military service can be drawn; and

"Whereas, The American Society of Civil Engineers, either as a body, or through the creation of volunteer bodies of its members, may be able to render material assistance to the Engineer Corps and other branches of the Army and Navy of the United States in the enormous task which they may have to undertake;

"Be It Resolved, That it is the sense of this meeting that the American Society of Civil Engineers should, as promptly as possible, through its duly authorized officers, confer with the proper Federal Authorities and place the facilities of its organization at their disposal to assist in developing a reserve corps of engineers to be used as required, either in construction of military works or for active service."

The resolution, being duly seconded, was carried unanimously.

The Secretary announced the transfer of the following candidates by the Board of Direction on May 5th, 1915:

FROM ASSOCIATE MEMBER TO MEMBER

THOMAS PETTUS BRANCH, Atlanta, Ga.  
JAMES EVANS BARLOW, Dayton, Ohio  
LOUIS HARVEY EHRBAR, Newark, N. J.  
STEPHAN WOOD MCCLAVE, Jr., Cliffside Park, N. J.  
JOHN ADAM O'CONNOR, Albany, N. Y.  
HENRY JENNESS SAUNDERS, San Francisco, Cal.  
GEORGE GARNETT SHEDD, Waltham, Mass.  
CHARLES SMITH SHELDON, Detroit, Mich.  
FREDERIC ANTES SNYDER, Montreal, Que., Canada  
HORACE RICHMOND THAYER, Pittsburgh, Pa.  
HERBERT ANGELL WHITNEY, San Diego, Cal.

FROM ASSOCIATE TO MEMBER

ALGER CROCHERON GILDERSLEEVE, New York City  
HARRISON WASHBURN HAYWARD, Boston, Mass.

The Secretary announced the following deaths:

HENRY CLAY DERRICK, of Houston, Va., elected Member, October 5th, 1887; died May 9th, 1915.

ALEXIS HENRY FRENCH, of Brookline, Mass., elected Member, June 6th, 1894; died May 3d, 1915.

WILLIAM CORNELL JEWETT, of Cincinnati, Ohio, elected Member, June 3d, 1885; died May 2d, 1915.

FRED STARK PEARSON, of New York City, elected Member, November 3d, 1897; died May 7th, 1915.

CLINTON F. STEPHENS, of New York City, elected Member, September 5th, 1877; died May 12th, 1915.

EDMUND KIMBALL TURNER, of Boston, Mass., elected Member, November 4th, 1891; died May 6th, 1915.

ALBERT LLOYD HOPKINS, of New York City, elected Junior, April 3d, 1894; Associate Member, April 3d, 1901; died May 7th, 1915.

Adjourned.

**June 2d, 1915.**—The meeting was called to order at 8:30 p. m.; S. C. Thompson, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 99 members and 19 guests.

A paper by W. L. Du Moulin, Assoc. M. Am. Soc. C. E., entitled "The Pumping Plant of the Morenci Water Company," was presented by the Secretary.

F. Lavis, M. Am. Soc. C. E., addressed the meeting informally on South America, illustrating his remarks with lantern slides.

E. L. Corthell, M. Am. Soc. C. E., spoke informally on the Madeira-Mamoré Railway and other engineering matters in South America.

The Secretary announced the following deaths:

EDWARD HARDING BARNES, of Grand Rapids, Mich., elected Member, December 5th, 1906; died May 15th, 1915.

WILLIAM GOMER DAVIES, of Sacramento, Cal., elected Junior, February 2d, 1904; Associate Member, November 8th, 1909; died May 9th, 1915.

LOUIS THOMAS FRANKLIN HICKEY, of San Francisco, Cal., elected Associate Member, June 24th, 1914; died May 18th, 1915.

RALPH ASHUR PIKE, of Los Angeles, Cal., elected Junior, March 6th, 1906; Associate Member, January 31st, 1911; died May 13th, 1915.

FRANK BURNS STOREY, of Rochester, N. Y., elected Junior, March 5th, 1912; died April 2d, 1915.

Adjourned.

#### ELECTIONS AND TRANSFERS BY THE BOARD OF DIRECTION, JUNE 3d, 1915

##### ELECTED AS MEMBERS

HAROLD ALMERT, Chicago, Ill.

ALEXANDER JAMES BARCLAY, East Auburn, Cal.

STOERK JOHAN BRATAGER, St. Paul, Minn.

FREDERICK HOWE CLARK, Springfield, Mass.

HANS HELLAND, San Antonio, Tex.

JAMES MACGREGOR MACMARTIN, Albany, N. Y.  
 SAMUEL HENRY MCCRORY, Takoma Park, D. C.  
 ANDREW HORACE MCDUGALL, Harvey, Ill.  
 SHELDON ELTON MINOR, Greenwich, Conn.  
 EDWIN AUGUSTUS STEVENS, Trenton, N. J.  
 ROBERT OWEN WYNNE-ROBERTS, Regina, Sask., Canada

ELECTED AS ASSOCIATE MEMBERS

SYLVAIN SELIC ABRAMS, San Francisco, Cal.  
 PAUL DE NYSE BURROWES, Chatham, Mass.  
 GEORGE HOWARD CANFIELD, Madison, Wis.  
 GEORGE ANDREW CHRISTENSEN, San Francisco, Cal.  
 HERMAN G CROW, Ann Arbor, Mich.  
 CLYDE EARL DURLAND, Billings, Mont.  
 JOHN HANSON ENSEY, Baltimore, Md.  
 THOMAS CLARK FRAME, Warren, Pa.  
 RUSSELL VERSTILLE GLENN, Iloilo, Philippine Islands  
 CHARLES GOODMAN, New York City  
 EDWARD LESLIE GOSNELL, Chattanooga, Tenn.  
 PHILIP WINTHROP HAM, San Francisco, Cal.  
 CHARLES RAYMOND HUMPHREYS, Wilmington, N. C.  
 HARRY GEORGE LEE, East Orange, N. J.  
 EDGAR SCOTT MCCANDLISS, Rolla, Mo.  
 DAVID CAMPSEY MORROW, Washington, Pa.  
 LEONARD DRAKE NORSWORTHY, New York City  
 SIDNEY ROBERT OKES, Minneapolis, Minn.  
 EVERARD LE COMPTE PATTISON, Roland Park, Md.  
 CHARLES ERNEST PETT, New York City  
 HENRY GEORGE REITZ, Cleveland, Ohio  
 STANLEY HORTON ROBERTSON, New Haven, Conn.  
 FRANK HURD ROBINSON, Hornell, N. Y.  
 HORACE HOLMES SEARS, Redwood City, Cal.  
 SHAO-YING DOUGLAS SHAE, Yochow City, Hunan, China  
 CLARK HERVEY SHAW, Long Beach, Cal.  
 WILSON SIDWELL, Posadas, Argentine Republic  
 LEWIS LUMBER WADSWORTH, Boston, Mass.  
 LEE HAMILL WALKER, Monte Christi, Dominican Republic  
 REINHOLD BERTRAM WOLFF, Glendale, N. Y.  
 JACOB FRANK WOODYARD, JR., San Antonio, Tex.  
 SHELDON SMITH YATES, New York City  
 EMIL ALBERT ZEITFUCHS, Oakland, Cal.

ELECTED AS ASSOCIATES

CHARLES GUY ELDREDGE, Fort Worth, Tex.  
 SAMUEL FISCHER MILLER, South Orange, N. J.

## ELECTED AS JUNIORS

ANDREW JOHN ALBERT ANDERSON, Champaign, Ill.  
HARRY MADARA BROWN, Washington, D. C.  
RALPH WALDO BUZZELL, Camden, Me.  
DEAN CHASE, St. Louis, Mo.  
TIENCHE CONKLIN CHUN, South Bethlehem, Pa.  
GEORGE MILES COLLINS, Honolulu, Hawaii  
THOMAS ERNEST CONNOLLY, Ukiah, Cal.  
SAMUEL CELLNER DREYFUS, Tyler, Tex.  
GERALD CHAPMAN FITZGERALD, Los Angeles, Cal.  
RICHARD EUGENE FROISETH, Thorp, Wash.  
HAROLD WILLOUGHBY FRY, Sydney, New South Wales, Australia  
LINTON HART, Annapolis, Md.  
GEORGE NORBERT KELLEY, Carthage, Mo.  
JAMES HENRY KENDALL, Chicago, Ill.  
HENRY MONROE LATHROP, New York City  
HENRY MARON LEHMAN, Hinckley, N. Y.  
CHARLES WALKER MACKEY, New York City  
CLYDE FULLER SMITH, Chicago, Ill.  
SILVANUS THOMAS SUEN, Madison, Wis.

## TRANSFERRED FROM JUNIOR TO ASSOCIATE MEMBER

HART CUMMIN, Dayton, Ohio  
GLEN EDGAR EDGERTON, Valdez, Alaska  
CLAES THEODORE EKMAN, Sault Ste. Marie, Mich.  
JOHN ADAM GUISINGER, Wynne, Ark.  
RAYMOND CLINTON KELLOGG, Brooklyn, N. Y.  
FERDINAND NORTHRUP MENESEE, Ann Arbor, Mich.  
RALPH EWART ROBSON, Atascadero, Cal.  
THOMAS FARWELL ROGERS, San José, Cal.  
GEORGE WASHINGTON SMITH, Montreal, Que., Canada  
RICHARDS MERLE STROHL, Jonesboro, Ark.

## TRANSFERS BY THE BOARD OF DIRECTION, JULY 7th, 1915

## TRANSFERRED FROM ASSOCIATE MEMBER TO MEMBER

HECTOR ROBINS BURROUGHS, New York City  
ARTHUR MANCHESTER CRAIN, Calgary, Alberta, Canada  
FRANCIS TRENHOLM CROWE, Boise, Idaho  
ELLIOTT JOHNSTONE DENT, New York City  
HAROLD JAMES DOOLITTLE, Colfax, Wash.  
HENRY EXALL ELROD, Dallas, Tex.  
CHARLES ALVIN EMERSON, Jr., Harrisburg, Pa.  
LLOYD MURRAY GRANT, Seattle, Wash.  
HOWARD ALEXANDER NELSON, Atlantic City, N. J.

CLIFFORD OLDER, Springfield, Ill.

GEORGE ARTHUR SAMPSON, Boston, Mass.

FREDERICK WILLIAM SCHEIDENHELM, Pittsburgh, Pa.

CHARLES DEPEW SEARLE, New York City

WINTHROP BARRETT WOOD, Wilmington, Del.

ADOLPH YAPPEN, Chicago, Ill.

TRANSFERRED FROM ASSOCIATE TO ASSOCIATE MEMBER

WILLIAM ROBERTS CONARD, Burlington, N. J.

**MINUTES OF MEETINGS  
OF THE BOARD OF DIRECTION**

(Abstract)

**July 6th, 1915.**—The Board met at 10 A. M.; President Marx in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bontecou, Bush, Crocker, Davies, Edwards, Endicott, Fuller, Greiner, Harwood, Haskell, Hawley, Herschel, Leonard, Loweth, McDonald, Ockerson, Tuttle, and Williams.

The report of the tellers on Membership Ballot canvassed June 3rd, 1915, was received, and the President declared the election of 11 Members, 33 Associate Members, 2 Associates, 21 Juniors, and the transfer of 10 Juniors to the grade of Associate Member.

The following committee was appointed to take up the question of the revision of the Constitution of the Society: M. T. Endicott, Chairman, John A. Ockerson, George F. Swain, Hunter McDonald, J. V. Davies, Herbert S. Crocker, and Chas. Warren Hunt.

Messrs. Desmond FitzGerald, William H. Burr, and George Gibbs, were appointed a Committee to Recommend the Award of Prizes for 1915.

Messrs. E. G. Haines and Allen Hazen were appointed as members of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, to take the places of Messrs. Frank M. Kerr and E. C. Shankland, resigned.

The following Resolution was adopted:

**RESOLVED:** That the next meeting of the Board be held during the week of the International Engineering Congress, and that regular mileage to members of the Board in attendance at that meeting be allowed.

**July 7th, 1915 (Adjourned Meeting).**—The Board reconvened, July 7th, 1915, President Marx in the Chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bontecou, Cooley, Crocker, Davies, Endicott, Fuller, Greiner, Haskell, Hawley, Herschel, McDonald, Ockerson, and Williams.

15 Associate Members were transferred to the grade of Member, and 1 Associate was transferred to the grade of Associate Member. Applications were considered and other routine business was transacted.

Adjourned.

**SOCIETY ITEMS OF INTEREST****Rules adopted by the Board of Direction in regard to  
Requirements for Admission to the various Grades of  
Membership in the Society.**

The Board of Direction has recently adopted by a letter-ballot of the whole Board certain Resolutions relating to the practice of administering Admission Requirements.

Prior to October 7th, 1908, the duty of the Board of Direction was to classify applications for admission, and to issue the names of applicants on a general ballot to the entire corporate membership. Up to that date, therefore, the final responsibility for elections of members rested upon the membership of the Society.

Since that date the responsibility of the Board has been greatly increased, and the present Constitution provides that all admissions to the Society, as well as all transfers from one grade to another, shall be in the hands of the Board.

In spite of the most careful scrutiny of all applications, criticism of the action of the Board in specific cases (that it has either been too lenient or too severe) has been heard.

This condition has resulted in a discussion which has extended over a period of several years, and some time ago a committee of the Board was appointed to investigate and to report upon the matter. After a very full consideration of that committee's report, the following rules were adopted by a letter-ballot of the whole Board.

The object of the Board in adopting these regulations was to render as uniform as possible the treatment of all applications, and their publication is intended to place before the membership more clearly the intent of the Constitution as interpreted by the Board.

It is the hope of the Board that, in recommending candidates for admission or transfer, the membership will bear these regulations in mind, and will continue to place in the hands of the Board any information that may have any bearing on the qualifications of applicants.

The statement and rules adopted by the Board are printed on the following page.



### Rules Governing Admission Requirements

"The requirements fixed by the Constitution are intended to mark the minimum which should be recognized for admission to membership, and the maintenance of a high standard necessitates that these provisions should be interpreted conservatively to the end that the fitness of applicants shall be established beyond doubt.

"In order to shape more definitely the requirements in the classification of applicants for admission or for transfer, and to assure as far as possible that applicants for membership meet the spirit of the requirements established by the Constitution, it is the sense of this Board:

"(1) That no applicant should be admitted to any grade whose qualifications do not clearly exceed the minimum requirements of the Constitution.

"(2) That each applicant for admission or for transfer shall furnish whenever possible, the names of persons, whether members of the Society or not, who have personal knowledge of his work in each of the positions enumerated in his application, and when possible shall have more than five references, and his application shall state in detail the character and extent of the works upon which he has been engaged, and the degree to which he was responsible for their design and execution.

"(3) That an applicant for membership or for transfer who, at the time of making his application is engaged on work for which an engineering education or training is not clearly essential, shall not be elected or transferred unless he shall have markedly superior qualifications as to professional experience.

"(4) That the professional work required for admission to the grade of Member shall be of a markedly higher order, and the degree of responsibility materially greater than for the grade of Associate Member.

"(5) That unless a candidate is eminently qualified for the highest grade, admission to that grade should be by transfer from the grade of Associate Member."

### ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

### FUTURE MEETINGS

**September 1st, 1915.—8.30 P. M.**—A regular business meeting will be held, and two papers will be presented for discussion, as follows: "The Twelfth Street Trafficway Viaduct, Kansas City, Missouri", by E. E. Howard, M. Am. Soc. C. E.; and "Pearl Harbor Dry Dock", by H. R. Stanford, M. Am. Soc. C. E.

These papers were printed in *Proceedings* for May, 1915.

**September 15th, 1915.—8.30 P. M.**—At this meeting two papers will be presented for discussion, as follows: "The Action of Water Under Dams", by J. B. T. Colman, Assoc. M. Am. Soc. C. E.; and "Concrete-Lined Oil-Storage Reservoirs in California: Construction Methods and Cost Data", by E. D. Cole, Assoc. M. Am. Soc. C. E.

These papers are printed in this number of *Proceedings*.

**October 6th, 1915.—8.30 P. M.**—This will be a regular business meeting. A paper by John Vipond Davies, M. Am. Soc. C. E., entitled "The Astoria Tunnel Under the East River for Gas Distribution in New York City", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

**October 20th, 1915.—8.30 P. M.**—At this meeting, a paper by F. zur Nedden, Esq., entitled "Induced Currents of Fluids", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

### ANNUAL CONVENTION

The Annual Convention of the Society will be held in San Francisco, Cal., September 16th, 17th, and 18th, 1915, being the Thursday, Friday, and Saturday immediately preceding the International Engineering Congress.

General arrangements for the Convention are in the hands of the following Committee:

C. E. GRUNSKY, *Chairman*,

H. L. HAEHL,

E. J. SCHNEIDER,

FRED R. MUHS,

E. T. THURSTON, JR.

The headquarters of the Society, Secretary's office, etc., will be at the St. Francis Hotel.

The first session of the Convention will be held at 10 A. M. on Thursday, September 16th, at which there will be welcoming addresses, and President Charles D. Marx will deliver the Annual Address, following which the Business Meeting will convene.

A programme in detail has already been issued to members.

Three of the other National Engineering Societies, under whose auspices the International Engineering Congress is to be held during the week beginning September 20th, 1915, will also hold meetings in San Francisco at about that time.

Arrangements have been made for a special train, and possibly more than one train, to accommodate the members of all these Societies who wish to attend their own meeting as well as the Congress, and circulars giving full details have been issued.

#### SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

In making a search it sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the material may be reproduced by photography, and this can be done for members at the cost of the work to the Society, which is small. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

#### PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should

be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

#### LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

##### San Francisco Association

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 p. m., at the Palace Hotel, on the third Friday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 p. m., every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary of the Association, E. T. Thurston, Jr., 713 Mechanics' Institute, 57 Post Street.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

##### (Abstract of Minutes of Meeting)

**June 18th, 1915.**—The meeting was called to order at the Palace Hotel; Vice-President Haehl in the chair; E. T. Thurston, Jr., Secretary; and present, also, 66 members and guests.

The following members of the Society were guests of honor of the Association at this meeting: Messrs. Rudolph Hering and Charles Warren Hunt, of New York City; Ralph Modjeski, of Chicago, Ill.; M. O. Eldridge, of Washington, D. C.; and A. L. Bush, of Los Angeles, Cal.

Mr. Thurston, for the Committee appointed to confer with the Engineers Club as to luncheon accommodations in its new quarters, reported that the matter would be taken up and decided in the near future. He also announced that the Engineers Club, with the object of securing an additional 100 members, had decided to remit the dues of new members for the first six months, and urged members of the Association to consider seriously affiliation with the Club.

The minutes of the Special Meeting of the Board of Directors, on April 22d, 1915, were read by the Secretary, and, on motion, duly seconded, the recommendation that the Board be authorized to expend funds of the Association, not to exceed \$250 per year, for the entertainment of visiting engineers, was adopted unanimously. In line with a further recommendation of the Board, it was moved and seconded that a committee of three be appointed to take charge of the social features of the next meeting of the Association. After discussion on the subject by Messrs. Kempkey, Derleth, Brunnier, and Rhodin, the motion was adopted, and the committee was appointed, as follows: Messrs. M. C. Couchot, H. J. Brunnier, and A. T. Parsons.

A letter from the Southern California Association calling the attention of members of the Association to the paper published in the February, 1915, *Proceedings* of the Society, entitled "Suggested Changes and Extension of the United States Weather Bureau Service in California", by Messrs. George S. Binckley and Charles H. Lee, was read by the Secretary, and he was instructed to spread the letter on the minutes of the meeting for the information of members of the Association.

Brief addresses were made by the President of the Society, Mr. Charles D. Marx, and by the Secretary, Mr. Charles Warren Hunt, and also by Messrs. Rudolph Hering and Ralph Modjeski.

Hermann Schussler, M. Am. Soc. C. E., addressed the meeting on "Reminiscences of Men and Events of Half a Century in California".

Adjourned.

#### **Colorado Association**

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary, L. R. Hinman, 1400 West Colfax Ave., Denver, Colo. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays, at 12.30 P. M., at the Albany Hotel.

Visiting members are urged to attend the meetings and luncheons.

#### **(Abstract of Minutes of Meetings)**

**May 15th, 1915.**—The meeting was called to order; President Vincent in the chair; Roger W. Toll, Secretary; and present, also, 21 members and guests.

The minutes of the meeting of April 10th, 1915, were read and approved.

A letter from Charles D. Marx, President, Am. Soc. C. E., was read.

A letter from the Southern California Association *in re* the work of the United States Weather Bureau, was referred to a committee consisting of Messrs. A. L. Fellows, Chairman, Robert Follansbee, and A. A. Weiland.

A Nominating Committee was appointed by the President, as follows: Messrs. H. S. Crocker, Chairman, M. S. Ketchum, Arthur Ridgway, A. Lincoln Fellows, and J. C. Ulrich.

A paper by Mr. J. E. Maloney on "Colorado State Highways", was read by the Secretary, who also presented a paper by T. J. Ehrhart, State Highway Commissioner. J. M. Kuykendall, Chairman of the Advisory Board, addressed the meeting on the work of the Highway Commission, and Fred C. Steinhauser, General Superintendent of Parks, described the road work in the Denver Mountain Parks. The subject was discussed by Messrs. S. B. Williamson, H. A. Bradford, W. B. Elcock, C. W. Comstock, and others.

Adjourned.

**June 12th, 1915.**—The Annual Meeting was called to order; President Vincent in the chair; Roger W. Toll, Secretary; and present, also, 18 members and guests.

The minutes of the meeting of May 15th, 1915, were read and approved.

President Vincent announced that a Committee consisting of Messrs. J. E. Field, Chairman, John A. Beeler, H. S. Crocker, J. B. Hunter, and Arthur Ridgway, had been appointed to draft a Resolution on the death of Mr. Herbert W. Cowan. The Resolution prepared by the Committee was read by Mr. Field, and, on motion, duly seconded, was carried unanimously. A letter from Mrs. Cowan addressed to the Association was read by the Secretary.

The Secretary announced that the proposed visit to the Minnequa Steel Works of the Colorado Fuel and Iron Company, at Pueblo, had been postponed indefinitely owing to lack of interest on part of the members of the Association in the trip at this time.

The Secretary announced that several members of the Association had attended the luncheon of the Denver Chamber of Commerce on May 22d, 1915, at which the speakers were Messrs. S. B. Williamson and Walter B. Elcock.

The report of the Reception Committee was read. On motion, duly seconded, the report was accepted and the Committee was continued and enlarged by the addition of the members of the Executive Committee of the Association.

The Committee appointed to report on the work of the United States Weather Bureau presented a Progress Report which, on motion, duly seconded, was accepted and the Committee continued. The Secretary was instructed to send a copy of the Report to the Denver office of the U. S. Weather Bureau.

The President addressed the meeting on the work accomplished by the Association during the past year.

The Secretary-Treasurer presented reports on the membership and finances of the Association, and announced that the records had been bound for preservation and future reference.



The President appointed Messrs. R. S. Sumner and T. H. Olds a Committee to audit the books of the Treasurer for the past year.

The report of the Nominating Committee was read, and, on motion, duly seconded, was accepted and the Committee discharged.

Messrs. Arthur Ridgway and T. W. Jaycox were appointed Tellers to canvass the ballots for the election of officers for the ensuing year, and President Vincent announced the result as follows:

*President, JOHN E. FIELD.*

*Vice-President, ROGER W. TOLL.*

*Secretary-Treasurer, L. R. HINMAN.*

A paper by Mr. Frederick H. Brandenburg, District Forecaster of the U. S. Weather Bureau, on "The Work of the United States Weather Bureau in Colorado", was presented by the author. A vote of thanks was tendered Mr. Brandenburg for his interesting and instructive paper.

A vote of thanks was tendered the retiring officers of the Association for their services during the past year.

Adjourned.

#### **Atlanta Association**

The Atlanta Association of Members of the American Society of Civil Engineers was organized on March 14th, 1912. The Association holds its meetings at the University Club, Atlanta, Ga.

At the meeting of the Association on January 9th, 1915, the following officers were elected for the ensuing year: President, Park A. Dallis; First Vice-President, B. M. Hall; Second Vice-President, P. H. Norcross; Secretary-Treasurer, T. B. Branch.

#### **Baltimore Association**

On May 6th, 1914, the Baltimore Association of Members of the American Society of Civil Engineers was organized, a Constitution adopted, and the following officers were elected: J. E. Greiner, President; Francis Lee Stuart, First Vice-President; L. H. Beach, Second Vice-President; Harry D. Williar, Jr., Secretary-Treasurer; and Messrs. H. D. Bush, B. T. Fendall, B. P. Harrison, Calvin W. Hendrick, Oscar F. Lackey, M. A. Long, and A. A. Thompson, Directors.

At its meeting of September 2d, 1914, the Board of Directors considered and approved the proposed Constitution of the Baltimore Association of Members of the American Society of Civil Engineers.

#### **Cleveland Association**

The proposed Constitution of the Cleveland Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on January 6th, 1915.

The following officers have been elected: President, Willard Beahan; Vice-President, Robert Hoffmann; Secretary-Treasurer, George H. Tinker.

#### **Louisiana Association**

At the meeting of the Louisiana Association of Members of the American Society of Civil Engineers (New Orleans, La.), on April



14th, 1915, the following officers were elected for the ensuing year: J. F. Coleman, President; W. B. Gregory and A. M. Shaw, Vice-Presidents; Ole K. Olsen, Treasurer; and E. H. Coleman, Secretary.

#### **Northwestern Association**

The proposed Constitution of the Northwestern Association of Members of the American Society of Civil Engineers (St. Paul and Minneapolis, Minn.) was considered and approved by the Board of Direction of the Society on November 4th, 1914. F. W. Cappelen is President and R. D. Thomas, Secretary.

#### **Philadelphia Association**

The meetings of the Philadelphia Association of Members of the American Society of Civil Engineers are held at the Engineers' Club of Philadelphia, 1317 Spruce Street.

The officers of the Association are as follows: President, Richard L. Humphrey; Vice-Presidents, F. Herbert Snow and Edgar Marburg; Directors, John Sterling Leans, J. W. Ledoux, H. H. Quimby, and H. S. Smith; Treasurer, S. M. Swaab; and Secretary, W. L. Stevenson.

#### **Portland, Ore., Association**

At the meeting of the Association on October 21st, 1914, the following officers were elected for the ensuing year: President, George C. Mason; First Vice-President, W. S. Turner; Second Vice-President, John T. Whistler; Treasurer, G. B. Hegardt; and Secretary, Charles J. McGonigle.

#### **(Abstract of Minutes of Meeting)**

**May 18th, 1915.**—The meeting was called to order; President Mason in the chair; Charles J. McGonigle, Secretary.

Mr. Chester J. Hogue, who is acting as Consulting Engineer for the Builders' Exchange in the matter of the revision of the building code of Portland, addressed the meeting, with a view of obtaining an expression of opinion from the Association on the advisability of allowing other than strictly fireproof buildings within the present fire limits.

On motion, duly seconded, the President was authorized to appoint a committee of five to consider this matter.

A paper entitled "Valuation of Water-Power Rights of Public Utilities", by Mr. J. P. Newell, was presented by the author and generally discussed.

A vote of thanks was extended to Mr. Newell for his interesting and instructive paper.

Adjourned.

#### **St. Louis Association**

The proposed Constitution of the St. Louis Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on October 7th, 1914.

The following officers have been elected: President, J. A. Ockerson; First Vice-President, Edward E. Wall; Second Vice-President, F. J. Jonah; Secretary-Treasurer, Gurdon G. Black. The meetings of the Association are held at the Engineers' Club Auditorium.

**San Diego Association**

The San Diego Association of Members of the American Society of Civil Engineers was organized on February 5th, 1915, and officers have been elected, as follows: President, George Butler; Vice-President, Willis J. Dean; and Secretary-Treasurer, J. R. Comly.

**Seattle Association**

The Seattle Association of Members of the American Society of Civil Engineers was organized on June 30th, 1913. At its meeting of January 25th, 1915, the following officers were elected for the ensuing year: President, R. H. Ober; Vice-President, A. S. Downey; and Secretary-Treasurer, Carl H. Reeves.

(Abstract of Minutes of Meetings)

**May 31st, 1915.**—The meeting was called to order at 12.15 P. M., at the College Club; President Ober in the chair; Carl H. Reeves, Secretary; and present, also, 14 members and guests.

The minutes of the meeting of April 26th, 1915, were read and approved.

A letter from Charles Warren Hunt, Secretary of the Society, was read, in which he explained the reasons for forwarding the 1915 List of Members by express rather than by mail.

A letter from W. K. Barnard, Secretary of the Southern California Association, addressed to Mr. John L. Hall, in reference to the paper, in the February, 1915, *Proceedings*, Am. Soc. C. E., by Messrs. George S. Binckley and Charles H. Lee, entitled "Suggested Changes and Extension of the United States Weather Bureau Service in California", was read. On motion, duly seconded, the President appointed Messrs. Bertram D. Dean, Robert Howes, and John L. Hall, a Special Committee to report on this paper at the June, 1915, meeting of the Association.

Various papers relating to House Bill No. 406, Illinois State Legislature, *in re* the licensing of engineers, were read, and ordered filed with similar papers for future reference.

A letter from Mr. C. E. Bogardus in reference to a proposed joint committee to conduct experiments with creosoted timber, under the direction of Mr. O. P. M. Goss, was read, and the President was authorized to appoint a member to represent the Association on such committee.

A letter from Robert A. Cummings, Chairman of the Society's Special Committee on the Bearing Value of Soils for Foundations, etc., was read. In his letter, Mr. Cummings called attention to the meager response to the circular issued by the Special Committee in February, 1915, and on motion, duly seconded, it was decided to make the circular the topic of discussion at the July meeting of the Association.

The report of the Conference Committee on the work of the Joint Committee of the various technical societies of Seattle *in re* the organization of a federated body of all such societies, to be known as The Associated Engineering Societies, was presented by Mr. Robert Howes, and on motion, duly seconded, the report in full was read to the meeting. On motion, duly seconded, it was decided that a copy of the Articles of the proposed Society should be sent to each member of the

Association and that discussion of the same and action thereon should be made the subject for the June meeting of the Association.

A unanimous vote of thanks was extended to Mr. Howes and the Conference Committee for their excellent work in this matter.

Adjourned.

**June 28th, 1915.**—The meeting was called to order at 12.15 P. M., at the College Club; A. S. Downey, Vice-President, in the chair; Carl H. Reeves, Secretary; and present, also, 23 members and guests.

The minutes of the meeting of May 31st, 1915, were read and approved.

The resignations of Messrs. H. C. Ogden and G. L. Youmans were accepted.

A letter from Robert A. Cummings, Chairman of the Society's Special Committee on the Bearing Value of Soils for Foundations, etc., was read. On motion, duly seconded, a committee, consisting of Messrs. John L. Hall, Chairman, C. E. Fowler, J. R. West, Joseph Jacobs, and A. Münster, was appointed to report thereon.

A letter from J. W. Peters, Secretary of the Association of Engineering Societies of St. Louis, *in re* the publication of papers, etc., was read.

The Special Committee appointed to review the paper entitled "Suggested Changes and Extension of the United States Weather Bureau Service in California", presented its report on the subject, which, on motion, duly seconded, was adopted by the meeting.

The special subject for discussion at this meeting being the Articles of Association of the Associated Engineering Societies of Seattle, Robert Howes, Chairman of the Conference Committee, re-read his report. It was moved and seconded that the Articles of Association be adopted. After discussion by Messrs. Bertram D. Dean, Henry L. Gray, and A. H. Fuller, on motion, duly seconded, it was decided to submit the proposed amendments to the Joint Committee of the various technical societies of Seattle for its consideration.

The subject was discussed further by Messrs. W. J. Ryan, Ernest B. Hussey, H. F. Tucker, and A. O. Powell.

Adjourned.

### **Southern California Association**

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bi-monthly meetings, with banquet, on the second Wednesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 P. M. every Wednesday, and the place of meeting may be ascertained from the Secretary of the Association, W. K. Barnard, 515 Central Building, Los Angeles, Cal.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

**Spokane Association**

The proposed Constitution of the Spokane Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on March 4th, 1914. Ulysses B. Hough is President.

**Texas Association**

The proposed Constitution of the Texas Association of Members of the American Society of Civil Engineers was considered and approved by the Board of Direction of the Society on December 31st, 1913. The headquarters of the Association is Dallas, Tex. John B. Hawley is President.

**MINUTES OF MEETINGS OF  
SPECIAL COMMITTEES****TO REPORT UPON ENGINEERING SUBJECTS****Special Committee on Stresses in Railroad Track**

**March 16th, 1915.**—The meeting was held at the Congress Hotel, Chicago, Ill. Present, A. N. Talbot (Chairman), A. S. Baldwin, J. B. Berry, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Paul M. La Bach, C. G. E. Larsson, Albert F. Reichmann, F. E. Turneure, and J. E. Willoughby (of the Committee) and, also, W. M. Dawley, P. H. Dudley, H. E. Hale, J. B. Jenkins, and Earl Stimson (of the Committee of the American Railway Engineering Association).

The preliminary tests, the results of which had been reported to the Committee in advance, were considered, and the conduct of the work during the coming season was discussed. The Committee decided to meet at Champaign, Ill., at a time when testing operations are in progress. The devices used in making the preliminary tests, and the new instruments in process of making, were exhibited and described. The Chairman was given authority to render bills from time to time against the American Railway Engineering Association fund, as well as the fund of the American Society of Civil Engineers, in accordance with the general budget approved by the Executive Committee. The general outline of tests was agreed to as a tentative plan of work. The matter of co-operation with the University of Illinois Engineering Experiment Station was approved.

**June 8th, 1915.**—The meeting was held at Urbana-Champaign, Ill. Present, A. N. Talbot (Chairman), A. S. Baldwin, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, Paul M. La Bach, C. G. E. Larsson, William McNab, G. J. Ray, and F. E. Turneure (of the Committee) and also W. M. Dawley, J. B. Jenkins, E. H. Fritch (Secretary), C. D. Gennett, Jr. (representing Robert W. Hunt), and C. B. Bronson (representing P. H. Dudley) (of the Committee of the American Railway Engineering Association).

The Committee inspected tests of track on the main line of the Illinois Central Railroad, about 2 miles north of Champaign, which included speed tests using a Mikado locomotive and static tests using single-load dynamometer apparatus and locomotive.

At the session held at the University of Illinois, the Chairman submitted a tentative programme of work to be undertaken by the Committee during the year, and there was a discussion on the programme of tests and the parts on which it was felt that emphasis should be placed this year.

The resolution of the Board of Direction of the American Society of Civil Engineers that the American Railway Engineering Association be asked to assist in securing the co-operation of the American Railway Association in the work of the Committee, was discussed and then referred to the Board of Direction of the American Railway Engineering Association.

#### **Special Committee on Concrete and Reinforced Concrete**

**June 23d, 1915.**—The meeting was held at Atlantic City, N. J. Present, Joseph R. Worcester (Chairman), William K. Hatt, Robert W. Lesley, and Richard L. Humphrey (Secretary).

The reports of various sub-committees were read, and future work was discussed.

It was agreed that the next meeting of the Committee should be held at the House of the Society on October 22d, 1915.

The Secretary was instructed to notify the Chairmen of sub-committees to have their reports ready to be mailed to the members of the Committee at least ten days before the meeting.

The influence of the flow of concrete, under static load long continued, on the working stresses was discussed and was referred to the Committee on Design for report.

#### **Special Committee on Steel Columns and Struts**

**June 23d, 1915.**—The meeting was held at the Hotel Traymore, Atlantic City, N. J. Present, Rudolph P. Miller, George H. Pegram, George F. Swain, J. R. Worcester, and Lewis D. Rights (Secretary). Dr. G. R. Olshausen, representing the U. S. Bureau of Standards, was also present.

Mr. Pegram was elected Chairman *pro tem*.

The minutes of the meeting of March 10th, 1915, were read and approved, and the unfinished business, as indicated by those minutes, relating to details of testing, done by the Bureau of Standards, the interpretation of results of tests made to date, and suggestions concerning new tests, were taken up in order.

A preliminary copy of the Progress Report was presented by Messrs. Rights, Miller, and Edwards. The report was read by paragraphs, corrected, and returned to the Sub-committee, with the request that it be rewritten and a copy sent to each member of the Committee for suggestion and study.

The Committee took action concerning resolutions on the death of Austin Lord Bowman, Chairman.

It was decided that the next meeting of the Committee should be held next fall.

#### **Special Committee on Materials for Road Construction**

**May 24th, 1915.**—The meeting was held at the House of the Society. Present, W. W. Crosby (Chairman), H. K. Bishop, Nelson

P. Lewis, Charles J. Tilden, George W. Tillson, and A. H. Blanchard (Secretary).

The minutes of the meeting of April 10th, 1915, were read and approved.

Mr. Lewis presented a progress report of the Sub-committee on Cost Data, and the report was discussed.

Mr. Tillson presented a progress report of the Sub-committee on Tests and Analyses, and tests for stone block, broken stone, broken slag, gravel, sand, paving brick, cement, concrete, wood block, asphalt block, rock asphalt, and bitumen content, were discussed.

It was decided that the next meeting of the Committee should be held at the House of the Society on July 7th, 1915.

#### **Special Committee on Valuation of Public Utilities**

**July 6th, 7th, 8th, and 9th, 1915.**—The meetings were held in Boston, Mass., at the office of the Chairman. Present, F. P. Stearns (Chairman), Charles S. Churchill, William G. Raymond, Henry E. Riggs, William J. Wilgus, and J. P. Snow.

The Committee discussed the chapters of the report relating to reproduction cost, land values, and depreciation; and arranged for revision of these chapters for incorporation in a report to the Society.

#### **Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, etc.**

**March 1st, 1915.**—The meeting was held at the Society House. Present, R. A. Cummings (Chairman), Samuel Tobias Wagner, and W. J. Douglas.

The minutes of the preceding meetings were read and approved.

The resignations of Messrs. E. C. Shankland and Frank M. Kerr were presented, and the Secretary was ordered to transmit these letters of resignation to the Board of Direction for acceptance, the Committee much regretting the loss of these members.

W. J. Douglas was elected Secretary of the Committee.

The 1915 budget of \$3 100, prepared by the Chairman, which had been previously submitted to the Board of Direction, was approved, all expenditures to be held in abeyance until the approval of the Board of Direction has been received.

The Chairman appointed sub-committees on the following subjects:

"C."—Codification of Information on Bearing Capacity of Soils, including Tests, Data from Structures, Local Practice, Local Laws, Literature, and Other References.

"A."—Analysis and Classification of Soils, including Laboratory Methods, Procedure, and Testing of Samples, and Experimental Investigations.

"B."—Bearing Capacity of Piles.

"E."—Earth Pressures, including External Pressure on Substructures, Tunnels, etc., Lateral Pressure on Retaining Walls, etc., and Passive Resistance.

"L."—Landslides.

"R."—Roadbed.

"W."—Erosion and Silting of Waterways.



Sub-Committee "A" is in consultation with the United States Bureau of Standards; Sub-Committees "E" and "L" are in consultation with the United States Bureau of Mines; and Sub-Committee "R" is in consultation with the Department of Public Roads and Railroad Committees.

**June 10th, 1915.**—The meeting was held at the office of Allen Hazen, M. Am. Soc. C. E., New York City. Present, R. A. Cummings (Chairman), E. G. Haines, Allen Hazen, and W. J. Douglas.

The Chairman reported the appointment of Messrs. E. G. Haines and Allen Hazen to succeed Messrs. Frank M. Kerr and E. C. Shankland, resigned.

Progress was reported on the development of laboratory apparatus and results of the study of various methods of mechanical analysis, laboratory procedure, and the classification of soils.

The Chairman of Sub-Committee "A" reported the following methods and apparatus in connection with the analysis and bearing capacity of soils:

- A sampler for obtaining samples of soil without disturbing the structural arrangement of the particles; that is, the obtaining of a core in its original condition;
- A tension machine for determining the tensile strength of the sample;
- A shearing and compression machine to ascertain the elastic qualities of the sample;
- A washing machine for removing the clay adhering to particles;
- A sifting screen for determining the mechanical composition of the sample, and an elutriating apparatus;
- A proposed method of ascertaining the density or voids;
- A penetration apparatus for measuring the bearing capacity for small areas; and
- A very thorough study of screens.

It was agreed that, in all the work of this sub-committee, the metric system would be used, and that further effort would be made to define the sizes of particles in unmistakable terms.

Mr. Cummings reported that the wet-sifting process was very much more satisfactory and accurate than the dry one, that the centrifugal apparatus which he had designed was rapid and accurate, and that he recommended its adoption; but it was deemed inadvisable to vote on this point at this time. Mr. Cummings stated that this centrifugal apparatus avoided violent shaking, and that it distributed the material radially across the screen at each revolution, the water seeming to facilitate the operation, particularly with clay soils.

The Chairman of Sub-Committee "C" reported comparatively few answers to the Committee's circular letter of January 1st, 1915, and, after discussion, it was unanimously agreed that a second letter should be sent out to a selected number of members of the Society, referring to the categorical questions and asking for similar data in a less comprehensive form, and in the manner preferred by those furnishing the data, the letter to be suggested by Mr. Hazen, modified as thought necessary by the Chairman, and transmitted to the various members by the Secretary of the Committee.



Mr. J. C. Meem, Chairman of Sub-Committee "B," reported by letter as follows:

"It was decided that the Chairman would take up the question of open cylinder piles, the relation of bearing value and skin friction, and also draft as soon as possible a personal letter to be sent out to all persons who might be interested in the subject, asking for tests and data on this subject.

"To Mr. Douglas was assigned the task of the preparation of historical notes on piling and the compilation of existing pile formulas and the application to side-piling of bearing and frictional values.

"To Mr. Haines was assigned the compilation of notes on various types of solid and sheet-piling and the application of these types to various uses.

"These subjects can be made as elastic as desirable by the members of the sub-committee. For instance, under the head of historical notes, all matters of interest may be taken up and any notes of interest in connection with the subject should be covered in the report.

"The Chairman is in a position just at this time to obtain very extensive and interesting data on the subject of open cylinder piling and is just now in touch with a proposed test which will shortly be made on the cross breaking value of a concrete-filled steel pile."

The following report was submitted by Mr. Douglas, Chairman of Sub-Committee "E":

"The second meeting of Sub-Committee "E" of the Soils Committee was held at the Machinery Club, on June 7th, 1915, and it was decided, tentatively:

"1.—That the chairman would start at once to prepare a complete history of the subject and compile formulas and general data, making such translations of foreign papers or parts of such papers as might be of interest to the sub-committee.

"2.—That Mr. Meem would design and submit to the sub-committee the necessary apparatus for experimental work to determine the bearing capacity of soils and their lateral pressure, and Mr. Haines would endeavor to obtain test records from the Government, from railroads and other corporations and from engineers in private practice.

"The problem which the sub-committee will endeavor to solve is divided into four parts:-

"(a) To determine experimentally the magnitude and direction of lateral earth pressure such as comes upon the backs of retaining walls, this is to be determined for the greatest practical variation of back-filling materials under various conditions. This work to be the basis of a practical working formula, and to include the determination of angles of repose of various materials and their weights, consideration being given to moisture content.

"(b) It was thought desirable, but not essential, at least at this stage of the work, to attempt to determine, experimentally or otherwise, the influence of earth pressure upon the carrying

capacity of foundations extending into the soil, as in the case of caissons.

"(c) To determine the magnitude of passive resistance of different materials by the analysis of existing tests and the making of new tests.

"(d) To determine the load upon tunnels, pipes, etc., for various materials in which they are constructed.

The Chairman reported the following record of valuable experiments, and recommended the translation of the papers by Professors Engels and Müller-Breslau:

#### Retaining Walls and Foundations.

##### English Experimenters:

Sir Benjamin Baker. "The Actual Lateral Pressure of Earthwork." *Minutes of Proceedings*, Inst. C. E., Vol. LXV. (This volume also contains experiments by Lieut. Hope and Col. Michon.)

G. H. Darwin. "On the Horizontal Thrust of a Mass of Sand." *Minutes of Proceedings*, Inst. C. E., Vol. LXXI.

G. Wilson. "Some Experiments on Conjugate Pressures in Fine Sand, etc." *Minutes of Proceedings*, Inst. C. E., Vol. CXLIX.

##### American Experimenters:

A. A. Steel. "Experiments on Earth Pressure Against Retaining Walls." *Engineering News*, October 19th, 1899.

E. P. Goodrich. "Lateral Earth Pressures and Related Phenomena." *Transactions*, Am. Soc. C. E., Vol. LIII.

Walter S. Lacher "Retaining Walls on Soft Foundations." *Journal*, Western Society of Engineers, March, 1915.

##### French Experimenters:

L. Leygue. *Annales des Ponts et Chaussées*, 6th Series, Vol. X, 1885.

M. Siegler. *Annales des Ponts et Chaussées*, 6th Series, Vol. XIII, 1887.

##### German Experimenters:

Professor Engels, Dresden. *Zeitschrift für Bauwesen*, 1896.

Professor Müller-Breslau. *Centralblatt der Bauverwaltung*, 1904.

##### Russian Experimenters:

Jankovsky and Kurdjumoff: *Société des Ingénieurs Civils de France*, 1892.

#### Tunnels, Sewers, Pipes.

A. Marston and H. O. Anderson. Iowa State College of Agriculture and Mechanic Arts, *Bulletin No. 31*.

Eugene Lauchli. "Tunneling," p. 97.

W. Cain. "Experiments on Retaining Walls and Pressures on Tunnels." *Transactions*, Am. Soc. C. E., Vol. LXXII.

J. C. Meem. "The Bracing of Trenches and Tunnels, with Practical Formulas for Earth Pressures." *Transactions*, Am. Soc. C. E., Vol. LX.

The Chairman also called attention to the following works on the theory:

Rankine. "Mechanics" and "Civil Engineering."

Ketchum. "Walls and Bins."

Cain. "Retaining Walls."

E. E. Halmos. "Theory of Slopes."

The Chairman suggested, for consideration only, the following objects to be kept in mind by Sub-Committee "E":

- (1).—To obtain historical data, including existing tests, formulas, accepted practice; also failures.
- (2).—To design the necessary apparatus for practical tests.
- (3).—To report to the Society as soon as possible the type of apparatus to be used and the method of making tests, and the approximate cost of the same. It was suggested, but not approved, that probably the best way to make tests, the apparatus having been designed and the methods worked out, was to ask the co-operation of one of the Government bureaus or one of the financially able colleges or institutions, the committee to co-operate as well as outline the character and extent of the tests, in so far as that was possible.
- (4).—The necessary data having been accumulated, to prepare rules and possibly formulas which will enable engineers to design foundations and retaining walls intelligently and conservatively.

The Chairman submitted a written report from Mr. Duryea on the plan and scope of Sub-Committee "W" (erosion and silting of waterways), but discussion was deferred.

#### **PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS**

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

**American Institute of Mining Engineers**, 29 West Thirty-ninth Street, New York City.

**American Society of Mechanical Engineers**, 29 West Thirty-ninth Street, New York City.

**Architekten-Verein zu Berlin**, Wilhelmstrasse 92, Berlin W. 66, Germany.

**Associação dos Engenheiros Cívis Portuguezes**, Lisbon, Portugal.

**Australasian Institute of Mining Engineers**, Melbourne, Victoria, Australia.

**Boston Society of Civil Engineers**, 715 Tremont Temple, Boston, Mass.

**Brooklyn Engineers' Club**, 117 Remsen Street, Brooklyn, N. Y.

**Canadian Society of Civil Engineers**, 176 Mansfield Street, Montreal, Que., Canada.

**Civil Engineers' Society of St. Paul**, St. Paul, Minn.

**Cleveland Engineering Society**, Chamber of Commerce Building, Cleveland, Ohio.

**Cleveland Institute of Engineers**, Middlesbrough, England.

**Dansk Ingeniorforening**, Amaliegade 38, Copenhagen, Denmark.

**Detroit Engineering Society**, 46 Grand River Avenue, West, Detroit, Mich.

**Engineers and Architects Club of Louisville**, 1412 Starks Building, Louisville, Ky.

**Engineers' Club of Baltimore**, 6 West Eager Street, Baltimore, Md.

**Engineers' Club of Minneapolis**, 17 South Sixth Street, Minneapolis, Minn.

**Engineers' Club of Philadelphia**, 1317 Spruce Street, Philadelphia, Pa.

**Engineers' Club of St. Louis**, 3817 Olive Street, St. Louis, Mo.

**Engineers' Club of Toronto**, 96 King Street, West, Toronto, Ont., Canada.

**Engineers' Club of Trenton**, Trent Theatre Building, 12 North Warren Street, Trenton, N. J.

**Engineers' Society of Northeastern Pennsylvania**, 415 Washington Avenue, Scranton, Pa.

**Engineers' Society of Pennsylvania**, 31 South Front Street, Harrisburg, Pa.

**Engineers' Society of Western Pennsylvania**, 2511 Oliver Building, Pittsburgh, Pa.

**Institute of Marine Engineers**, The Minories, Tower Hill, London, E., England.

**Institution of Engineers of the River Plate**, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.

**Institution of Naval Architects**, 5 Adelphi Terrace, London, W. C., England.

**Junior Institution of Engineers**, 39 Victoria Street, Westminster, S. W., London, England.

**Koninklijk Instituut van Ingenieurs**, The Hague, The Netherlands.

**Louisiana Engineering Society**, State Museum Building, Chartres and St. Ann Streets, New Orleans, La.

**Memphis Engineers' Club**, Memphis, Tenn.

**Midland Institute of Mining, Civil and Mechanical Engineers**, Sheffield, England.

**Montana Society of Engineers**, Butte, Mont.

**North of England Institute of Mining and Mechanical Engineers,**  
Newcastle-upon-Tyne, England.

**Oesterreichischer Ingenieur- und Architekten-Verein,** Eschen-  
bachgasse 9, Vienna, Austria.

**Oregon Society of Civil Engineers,** Portland, Ore.

**Pacific Northwest Society of Engineers,** 312 Central Building, Seat-  
tle, Wash.

**Rochester Engineering Society,** Rochester, N. Y.

**Sachsischer Ingenieur- und Architekten-Verein,** Dresden, Germany.

**Sociedad Colombiana de Ingenieros,** Bogota, Colombia.

**Sociedad de Ingenieros del Peru,** Lima, Peru.

**Societe des Ingenieurs Civils de France,** 19 rue Blanche, Paris,  
France.

**Society of Engineers,** 17 Victoria Street, Westminster, S. W.,  
London, England.

**Svenska Teknologforeningen,** Brunkebergstorg 18, Stockholm,  
Sweden.

**Tekniske Forening,** Vestre Boulevard 18-1, Copenhagen, Denmark.

**Western Society of Engineers,** 1737 Monadnock Block, Chicago, Ill.

## ACCESSIONS TO THE LIBRARY

(From May 4th to July 24th, 1915)

## DONATIONS\*

## THE RAILROAD TAPER:

The Theory and Application of a Compound Transition Curve Based Upon Thirty-Foot Chords. By Lee Perkins. Leather,  $7\frac{1}{2} \times 4\frac{1}{2}$  in., illus., 10 + 356 pp. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, Limited, 1915. \$2.50.

This handbook, the preface states, has been prepared as an extension of the well-known and widely used compound transition curve and tables devised a number of years ago by William Hood, M. Am. Soc. C. E. The author, it is said, has endeavored in this book to simplify the use of the taper and lessen the work in the field, and, with this in view, he has added, to a brief explanation of the taper, a solution of all the usual curve problems as applied to tapered curves, which problems, it is said, are available for use with tables of any transition curve. As developed, this transition curve, it is stated, is theoretically a series of compound curves, each branch having a 30-ft. (10-in.) chord. The various tables have been compiled, it is stated, to enable the engineer to run in this series of compound curves as easily as he would a simple curve and from a single setting of the transit. The primary taper tables give the various taper functions for every 30 ft. of taper, and additional tables, it is said, have been furnished, which give the taper functions for main curves of intermediate degree, the values having been interpolated trigonometrically. Simple equations, it is said, for all the angular functions, have also been included. The radius of the main curve, in accordance with present practice, is assumed to be based on a 50-ft. chord throughout. All the functions of the taper, for both field and drawing-room work, are given for eleven different tapers of increasing increment, but three of the eleven, it is said, will be found to answer most needs except in mountainous country. The taper numbers are said to be those generally used for these curves. The problem of tapering old circular curves, which differs, it is stated, essentially from the location of new ones, has been discussed separately, and a simple solution of the insertion of tapers between the branches of compound curves is also given. The tapers are said to have been calculated for metric curves for the use of American engineers in Mexico and South America. The Contents are: Introduction; Development of the Taper; Location Problems; Simple Curves; Compound Curves; Curves Beyond the Frog; Field Work; Obstructions on the Taper; Office Work; Methods of Inserting Tapers; Simple Curves; Compound Curves; Tables; Metric Tables.

## THE EARNING POWER OF RAILROADS, 1914.

Compiled and Edited by Floyd W. Mundy. Cloth,  $7\frac{1}{2} \times 5$  in., 514 pp. New York and Chicago, Jas. H. Oliphant & Co., 1914. \$2.00.

The preface states that this volume contains important statistics and other facts relating to the earning power and to the securities of 158 railroads, including those of the United States, Canada, Mexico, and a few other American countries. These statistics, it is stated, have been compiled almost exclusively from official annual railroad reports, and are arranged in convenient form for ready reference for the use of investors and others interested in the subject. The Introductory Chapters are said to explain in a general way the fundamental principles necessary to a knowledge of the value of the stocks or bonds of any railroad. Important statistics showing the range of earnings of railroads over a series of years, their mileage, capitalization, tonnage, income accounts, etc., are presented in Tables and are arranged, it is said, to permit of easy comparison between those of each road. These Tables are followed by Notes which, it is stated, illustrate and supplement the facts given in the Tables, and contain information relating to dividends, capitalization, appropriations for improvements, securities and lands owned, character of rail used, etc., etc. The Contents are: Index to Railroads; Introductory Comments; Income Account; Operating Expenses; Maintenance Expenses; Maintenance of Way; Maintenance of Equipment; Traffic; Transportation and General Expenses; The Operating Ratio; Fixed Charges; Stock Outstanding in Its Relation to Earning Power; Guarantees and Their Relation to Surplus Available for Dividends; Tables; Notes.

\* Unless otherwise specified, books in this list have been donated by the publishers.



**MERCHANTS' PARCEL POST AND EXPRESS GUIDE:**

Parcel Post and Express Charges from New York City to All Express Stations in the United States. Cloth, 11 x 8½ in., unpagcd. New York, W. H. Chandler, 1914. \$3.50.

As stated in the title, this Guide gives the parcel post and express rates from the New York City Post Office to every express office in the United States located on the line of a railroad and to many points reached by stage or steamer lines. The parcel post rates apply, it is stated, from post offices under the jurisdiction of the New York Office and all others in Postal Unit 767, and all express charges apply from all points in New York State located in Express Sub-Block 952-A. That part of the volume devoted to rates is preceded by explanatory matter relating to the Domestic Parcel Post, such as Insurance, C. O. D. service, special rates, weights, unmailable matter, packing of liquids, etc., etc. The portion devoted to rates is arranged alphabetically by States, under which is given, also alphabetically, the names of the stations in that State, followed by letters indicating the names of express companies serving those points, the express rate block, and the parcel post zone. At the end of each State is the rate sheet of parcel post and express charges for points in that State. At the end of the book is given the Official Express Classification, including freight classification rules, with index, and the local and joint schedule of first and second-class express rates, effective February 1st, 1914. Supplements are issued from time to time showing the changes made in the various States, thereby keeping the volume up to date.

**THE PANAMA CANAL AND THE PACIFIC COAST.**

Compiled and Edited by George M. Shepherd. Cloth, 15 x 8½ in., illus., 176 pp. New York, William B. Dana Company, 1914. \$2.00. (Donated by Mr. Shepherd.)

In a secondary title, it is stated that the contents of this volume were issued originally as a supplement to "The Commercial and Financial Chronicle", in New York City, on November 28th, 1914, and, by special arrangement, they were issued simultaneously, in the same manner, by "The Economist", in London, England, and "The Economist", in Chicago, Ill. The purpose of the publishers, it is stated, has been to provide an authentic and reliable work of reference in regard to the commercial and financial conditions existing in the Pacific Coast Territory at the time of the opening of the Panama Canal. The text consists of editorial and special articles on the subject, as well as statistical tables, and special efforts have been made, it is said, to make the advertising pages as valuable for reference purposes as the remainder of the book. The text also contains many half-tone views of the places and subjects discussed. The Contents are: Editorial Section: The Pacific Coast; The Canal and the Pacific Coast. The Panama Canal: The Panama Canal—Its History and Construction, by Isham Randolph; The Use and Benefits of the Panama Canal, by Emory R. Johnson; The Panama Canal and the Railroads, by John Maurice Clark; The Remote Effects of the Panama Canal, by John Bates Clark. The Pacific Coast: Banks and Banking on the Pacific Coast, by J. K. Lynch; The Public Utilities of the Pacific Coast, by C. L. Cory; The Present Status of Western Irrigation, by Walter V. Woehlke; Water Powers of the Pacific Coast, by W. E. Herring; Rivers and Harbors of the Pacific Coast of the United States, by W. H. Bixby; Pacific Coast Securities, by G. K. Weeks; Mining on the Pacific Coast, by H. Foster Bain; The Agriculture of the Pacific Coast, by Thomas H. Means; Intensive Farming on a Large Scale, by S. F. B. Morse; The Oil Industry of California, by Frank J. Silsbee; The Shipping Industry of the Pacific Coast, by Robert Dollar; Fish Facts and Figures, by Miller Freeman. The Expositions: The Panama California Exposition at San Diego. Timber Section: The Redwood of California, by Junius H. Browne; Pacific Coast Timber, by G. X. Wendling; Timber Bonds, by T. S. McGrath. State and City Section: Debts and Resources of States, Cities and Towns in the Pacific Coast States. Corporation Section: Securities and Reports of Public Service and Miscellaneous Corporations of the Pacific Coast; Public Service Companies.

**CONSERVATION OF WATER BY STORAGE:**

Addresses Delivered in the Chester S. Lyman Lecture Series, 1914, Before the Senior Class of the Sheffield Scientific School, Yale University. By George Fillmore Swain, Past-President, Am. Soc. C. E. Cloth, 10 x 7 in., illus., 17 + 384 pp. New Haven, Yale University Press; London, Humphrey Milford; Oxford University Press, 1915. \$3.00. (Donated by the Author.)

In the preface the author states that, in this, the third of the Chester S. Lyman Lecture Series, he has endeavored to avoid duplication of previous courses,



and hopes that these lectures will constitute a contribution to the general subject which may be of interest and value not only to engineering students but also to members of the Profession, especially to those interested in the legal aspects of water power. In the first chapter, devoted to the general subject of Conservation, the situation confronting the people of the United States is outlined, it is said, and the nature of the problem is described. In the next four chapters, which are stated to deal largely with the legal technicalities of the problem, the author discusses the relation of conservation of water to that of other resources, the water-power question, and the controversy which has been waged in and out of Congress with reference to Federal control of water powers. This part of the volume, it is said, contains a more thorough discussion and summary of the entire question than is to be found in any other single publication. Chapter VI deals with the storage of water and the regulation of its flow, and in Chapter VII, the author discusses the general principles involved and the logical methods to be applied in studying the relation of forests to stream flow. In the concluding chapter there is a brief general discussion of the subject of floods and flood prevention. Appendices I to VI contain various Acts of Congress relating to water storage, water-power laws, etc., and in Appendix VII, the author has included a list of references to publications to be used in further study of the subject. The Contents are: Conservation in General; The Conservation of Water and its Relation to the Conservation of Other Resources; Water Power at Government Dams on Navigable Streams; Water Power at Private Dams on Navigable Streams; Water Power on the Public Domain; Technical Aspects of Conservation by Storage; Forests and Stream Flow; Floods; Conclusions of Subcommittee of the Committee on the Judiciary, United States Senate; The General Dam Acts; The Coosa River Dam Act and Veto Message of President Taft; Connecticut River Dam Bill, 1913, with Letter from Henry L. Stimson, Secretary of War; Memorandum of Acts of Congress Concerning Privileges at Government Dams; The Wisconsin Water-Power Law of 1913; References; Index.

#### WATER PURIFICATION PLANTS AND THEIR OPERATION.

By Milton F. Stein, Assoc. M. Am. Soc. C. E. Cloth, 9½ x 6 in., illus., 8 + 258 pp. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, Limited, 1915. \$2.50.

The primary object of the author in this book, the preface states, has been to give simple and concise instructions for the operation of water purification plants. The subject is said to be discussed with special regard to the requirements of the non-technical operator of small plants, as well as for water-works chemists and engineers, and, for that reason, the author has included all information and data required in their operation, such as instructions for preparing standard solutions, making chemical and bacteriological tests, handling coagulants, washing filters, keeping records, processes of coagulation, sterilization, water softening, sedimentation, etc. Charts for solving, graphically, problems relating to chemical tests and the application of coagulants, are also included. For the water-works engineer, there is a chapter giving detailed descriptions of the various types of plants and their component parts, and there is also a chapter which treats of the natural chemistry of water showing the derivation of its chemical constituents from the geological formations with which it comes in contact. In order to maintain simplicity and clearness to the non-technical reader, the author, it is stated, has handled parts of the subject arbitrarily and has also given the products of chemical reactions as definite salts formed instead of in the more scientific ionic form. The Chapter headings are: Water and its Impurities; Types of Purification Plants; Physical and Chemical Tests; Bacterial Tests; Interpretation of Tests; Coagulation and Sterilization; Water Softening; Sedimentation; Filtration and General Operation; Plates I to XI; Appendix A, Analysis of Coagulants; Appendix B, Standard Solutions; Appendix C, Specifications for Coagulants; Appendix D, Weir Table; Index.

#### GUIDE TO THE REPORTS, EVIDENCE, AND APPENDICES

Of the Royal Commission on Sewage Disposal. By G. Bertram Kershaw, M. Am. Soc. C. E. Cloth, 8½ x 5½ in., 8 + 178 pp. London, P. S. King & Son, Ltd., 1915. 5 shillings. (Donated by the Author.)

In this work, the author, who is Engineer to the Commission, has endeavored to provide a handy reference book on the subject-matter contained in the various Reports and Appendices made by the Royal Commission on Sewage Disposal. Ten of these Reports which, with numerous Appendices, make in all about thirty volumes, have been issued, and, as stated, it is difficult for the reader interested in a special subject to find the particular volume he requires or to isolate a special section. The author has treated the volumes serially, giving for each the date, the number of pages, and the price. He has also extracted from each Report and Appendix all

the headings and sub-headings, thus giving, in condensed form, the subject-matter contained in them. Opposite each heading or sub-heading is given the page or pages of the Report or Appendix in which it occurs, and the number of the Report is shown in the running head. The names of witnesses and their evidence has been similarly treated. At the end of the book the author has included an Index of Names, a Place Index, and a comprehensive Subject Index to facilitate its use, and he hopes that the volume may prove of service to all who may have occasion to refer to the Reports of the Royal Commission.

#### **SANITATION IN PANAMA.**

By William Crawford Gorgas. Cloth, 8 x 5½ in., illus., 298 pp. New York and London, D. Appleton and Company, 1915. \$2.00.

The sanitary work done in Havana and the Canal Zone by the author and his associates has demonstrated the fact that the white man can live as well in the tropics as in the temperate zone. In this book, the author describes the experiments undertaken by the Americans after the occupation of Cuba, which resulted in the discovery of the part played by the mosquito in the transmission of yellow fever and the successful results accomplished in Havana after the sanitary regulations against the fever had been carried out. When the construction of the Panama Canal was begun, the author was made Chief Sanitary Officer of the Canal Zone, and he also relates how, by adopting the sanitary methods used so successfully in Cuba and by eliminating yellow fever and controlling other tropical diseases, he and his assistants transformed Panama from one of the most unhealthy localities in the world into a clean, healthy country and made possible the construction of the Panama Canal. The work is described in non-technical language and the book is intended for the general reader as well as the physician and health officer. The Contents are: Yellow Fever and the Discoveries of Its Transmission; The Experiments of the Reed Board; The Discoveries of the Reed Board; The Sanitary Board of Havana; Sanitary Work at Havana; The Results Accomplished in Havana; Correspondence with Dr. Reed; History of Yellow Fever; Appointed Chief Sanitary Officer for the Isthmus; Preliminary Organization and Work at Panama; Yellow-Fever Work at the Isthmus; Nombre-de-Dios; The Work of the Sanitary Inspectors; The Work at the Hospitals; Malaria Work and the Hospital System; Medical and Surgical Service at Ancon Hospital; The Sanatorium at Taboga; The Leper Colony; Quarantine System; Measures Against Bubonic Plague; The Work of the Sanitary Department of Panama; Index.

#### **OVERCROWDING AND DEFECTIVE HOUSING IN THE RURAL DISTRICTS.**

By Harvey B. Bashore. Cloth, 7½ x 5 in., illus., 92 pp. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, Limited, 1915. \$1.00.

The author of this little book is a physician and an Inspector of the Pennsylvania Department of Health, who, in his official capacity, has had opportunities to study the land and house overcrowding which exists in country districts and its effects. He states that his observations, as related, were made for the most part in a typical rural farming community, inhabited by native-born Americans, and show that overcrowding conditions in the country are as bad or worse than they are in large cities. He describes briefly the manner of overcrowding on the land, in homes, and in schools, together with its results. He also includes a few statistics of resulting disease which he has compiled, and states that the remedy is to be found in the proper education of country people, by the proper health authorities, by the school, and by the press, as to the penalties, such as tuberculosis, etc., which follow in the wake of overcrowding, poor food, and bad living. The Chapter headings are: Land Overcrowding; House Overcrowding; Defective Building; Overcrowded and Defective Schools; Results.

#### **THE COMMERCIAL PROBLEM IN BUILDINGS:**

A Discussion of the Economic and Structural Essentials of Profitable Building; and the Basis for Valuation of Improved Real Estate. By Cecil C. Evers. Cloth, 8½ x 5½ in., illus., 12 + 274 pp. New York, The Record and Guide Co., 1914. \$1.50.

Buildings are essentially utilities, and their commercial and financial success depends, it is said, on certain factors which have been learned from observation and experience. In this book which it is hoped may call the attention of all who are interested in real estate to the utilitarian and commercial requirements of buildings as distinguished from their architectural and structural needs, the author, it is

said, discusses those factors which are detrimental or beneficial to buildings from the standpoint of the investor, as well as the buildings themselves. He points out the differences between commercial and structural values and between commercial and structural life, and discusses such factors as site, accessibility, transportation, etc., and the influences exerted on buildings by their surroundings, together with the results of municipal and legislative actions and restrictions. The building itself, its construction, plan, decorations, etc., is also discussed, as well as the bearing which all these factors has on its commercial value. The method of ascertaining the value of improved real estate is pointed out in order to show, it is stated, that the ultimate test of the value of a building is its earning capacity and not its cost. The Contents are: Introductory; Evolution and Growth of Cities; Evolution of Buildings; The Commercial Problem in Buildings; Commercial Value of Buildings; The Real Estate Problem; The Structural Problem; Requirements of Different Classes of Buildings; Multiple or Collective Residences; Business Buildings; Shops and Stores; Commercial and Structural Life and Depreciation, Maintenance, Repairs and Operations; Valuations; Index.

#### SUBMARINE VESSELS.

Including Mines, Torpedoes, Guns, Steering, Propelling, and Navigating Apparatus, and with Notes on Submarine Offensive and Defensive Tactics, and Exploits in the Present War. By W. E. Dommett. Cloth,  $7\frac{1}{2} \times 5$  in., illus., 10 + 106 pp. London and New York, Whittaker & Co., 1915. 60 cents. (Donated by Macmillan Co.)

The subject-matter contained in this book has been compiled, it is stated, from the author's notes, made, from time to time, on submarines. He describes their history, construction, operation and maintenance, their armament, and fittings, as well as their use and exploits in active service, with especial reference to those of the British Navy. The text, it is said, is presented in such a manner that it may be of interest to the general reader and, at the same time, contain sufficient technical matter to be of value to those having some technical knowledge of the subject. The Chapter headings are: Historical; British Naval Submarines; Submarine Tactics; Steering and Manœuvring Apparatus; Propelling Plant; Armament; Navigation Fittings; Routine on Submarines; Mines, Observation and Contract; Auxiliary Vessels.

#### THE OFFICIAL GOOD ROADS YEAR BOOK OF THE UNITED STATES, 1915.

American Highway Association. Cloth,  $9\frac{1}{4} \times 6\frac{1}{4}$  in., 10 + 498 pp. Washington, D. C., American Highway Association, 1915. \$1.00.

As stated in the title, this volume is issued annually by the American Highway Association, and is intended to be an aid to engineers, manufacturers, contractors, street and road officials, etc., in road materials, construction, maintenance, and administration. An idea of the scope of the topics discussed may be obtained from the Contents, as follows: General Review of Progress in Road Improvement in 1914; History of Road Building; Road Systems of Foreign Countries; State Aid Legislation; Local Road Legislation; Legislation Governing Local Bond Issues; Bond Issues for Road Improvement; Digest of Convict Labor Laws; Convict Labor for Road Improvement; Digest of State Civil Service Legislation Applicable to Road Officials; Digest of Automobile Registration Laws; Types of Roads; Road Maintenance and Repair; Dust Preventives; Highway Bridges and Culverts; Massachusetts Specifications for Highways; Highway Officials; State and U. S. Progress Reports; Highway Improvements in Canada; State Funds Available for 1915 Road Work; Patents Issued by United States Patent Office in 1914 Pertaining to Roads; Patented Method of Road Construction; Treatises on Road, Bridge, and Culvert Construction and Allied Subjects; Bulletins, Circulars, and Documents; Reference List of Papers, Addresses and Magazine Articles Published in 1914; Highway Engineering Education; Trade Names; Office of Public Roads, U. S. Department of Agriculture; Tables of Quantities, Weights, and Measurements Used in Road Work; Road Associations; Mileage of Improved and Unimproved Roads; Manufacturers; American Highway Association.

#### AN INTRODUCTION TO TOWN PLANNING:

A Handbook Dealing with the Principles of the Subject and a Consideration of the Problems Involved, Powers of Local Authorities, etc., with Appendices on Garden Cities and Garden Suburbs, Schedule of Town Planning Act, etc. By Julian Julian. (Griffin's Scientific

Text-Books.) Cloth, 8 x 5½ in., illus., 7 + 149 pp. London, Charles Griffin & Co., Limited, 1914. \$1.75. (Donated by J. B. Lippincott Co.)

In 1909, the Housing, Town Planning, etc., Act was passed in Great Britain, by which the control of town planning was placed in the hands of local authorities, thus creating, it is stated, opportunities for many persons to confer as to the future development of a town or city. The preface states that it has been the author's aim, in this book, to deal with the principles of town planning, to indicate some of the subjects to be investigated, and to suggest some of the problems to be solved, in short, to make the volume serve as a guide to those interested and engaged in the subject. He first gives a brief history of town planning and of the laws relating to the subject, followed by practical suggestions to be considered, a description of a town planning tour, and appendices relating to garden cities, English examples of town planning, laws and Acts, and a short bibliography of the subject. The Contents are: Ancient Town Planning; Mediæval and Modern Town Planning; Authorities and Bye-Laws; Powers of Local Authorities; Practical Considerations in the Preparation of Town Plans; A Town-Planning Tour; Appendix I, Garden Cities and Garden Suburbs; Appendix II, English Examples of Town Planning; Appendix III, Programmes and Resolutions of Congresses, Schedule of Town Planning Act; Appendix IV, Books and Papers on Town Planning, and Other Books Consulted or Quoted From; Index.

#### MANUAL OF SURVEYING FOR FIELD AND OFFICE.

By Raymond E. Davis. Morocco, 7 x 4½ in., illus., 15 + 395 pp. New York and London, McGraw-Hill Book Company, Inc., 1915. \$2.50.

Much of the material contained in this volume has been suggested, it is stated, through questions asked and mistakes made by students and inexperienced surveyors, and it has been the author's aim to provide herein an efficient means of teaching students the proper use of surveying instruments, the proper procedure in making surveys, and the proper methods of computing and mapping, in such a manner that they may see clearly the purpose of their work, a method of accomplishing it, and the reason for using such a method. In the first chapter which deals with general instruction for field and office work and emphasizes the more difficult and important parts of surveying, such as note-keeping, precision measurements, etc., the student, it is stated, is prepared for the practice of surveying, as developed progressively in the succeeding chapters, from elementary work with the tape to complete topographic surveys. Although the book is designed primarily for use with a treatise on surveying, if field and office practice is developed with theory, or for practical use alone, it is also adapted, it is said, for use in short elementary courses in surveying, and is intended as a manual of surveying practice for the use of students in civil engineering in preparation for field and office exercises. It is of convenient weight and size to be carried in the coat pocket, and the subject-matter is made up of problems and their explanations, together with suggestions in relation to such problems, sample pages of notes and computations, all the tables ordinarily used in plane and topographic surveying, etc., etc. The Chapter headings are: Field and Office Work; Elementary Field Problems; Compass and Transit Problems; Level Problems; Use of the Plane-Table and Sextant; Field Astronomy; Topographic Surveying; Office Problems; Index.

#### POCKET COMPANION FOR ENGINEERS, ARCHITECTS AND BUILDERS.

Containing Useful Information and Tables Appertaining to the Use of Steel Manufactured by Carnegie Steel Company, Pittsburgh, Pa. Seventeenth Edition. Leather, 8 x 5 in., illus., 428 pp. Pittsburgh, Pa., Carnegie Steel Company, 1915. \$1.00.

Since the issuance of the fifteenth edition of this Pocket Companion in 1903, many changes are said to have been made in the art of bridge and building construction, and the use of steel has been extended to lines other than those covered at that time. As in previous editions, an endeavor has been made, it is said, to eliminate from this volume obsolete forms of construction; to revise the forms retained from the 1903 edition, in order to make them conform to present practice; and to incorporate such additional information on the newer lines of manufacture as will be of interest to engineers, architects, and builders. Among other things, the book contains the Standard Specifications for structural and rivet steel as adopted in 1914 by the American Society for Testing Materials and a new table on standard punching of flanges of beams and channels. The tables of extreme sizes of plates have been extended to include those of nickel steel, and the sizes of channels, bulb angles, checkered plates, merchants bars, etc., have been revised. The illustrations and tables used in this book

as suitable for bridge, building, locomotive, car, and ship construction, have been selected from the large number of rolled shapes manufactured by the Company. A detailed subject index of the contents is also included.

#### PURCHASING.

By C. S. Rindsfoos, Jun. Am. Soc. C. E. Cloth,  $9\frac{1}{2} \times 6\frac{1}{4}$  in., 10 + 165 pp. New York and London, McGraw-Hill Book Company, Inc., 1915. \$2.00.

The importance of the art of purchasing and the lack of literature on the subject has led, it is said, to the preparation of this book. In making any purchase, the essential object, it is stated, is to obtain the article best suited to the buyer's requirements at the lowest price and in the shortest time, and in this volume, the author has endeavored to explain and illustrate clearly the principles involved in such transactions. He also discusses fixed policies of purchasing as applied to a particular business, the personal characteristics and qualifications necessary to a successful buyer, departmental organization, etc. In Chapter VII, prepared by Mr. William W. Taylor, a few of the fundamental legal principles are explained and discussed, and the author has also included, in the last chapter, a number of sample forms and contracts for use in the purchasing department, which are stated to represent standard practice. The Contents are: How to Obtain the Right Article; How to Obtain the Lowest Price; How to Obtain Prompt Delivery; Making the Purchase Conform to Fixed Policy; How to Obtain Favorable Terms; Personal Characteristics and Qualifications; Strategy; Some Legal Aspects of Purchasing; Departmental Organization; Forms; Index.

#### HÜTTE: DES INGENIEURS TASCHENBUCH.

Herausgegeben vom Akademischen Verein Hütte, E. V. 22. Auflage. Cloth,  $7\frac{1}{4} \times 5$  in., illus., 3 vol. Berlin, Wilhelm Ernst & Sohn, 1915. 21 Marks.

In this, the twenty-second edition of this Handbook, the arrangement of the preceding editions, it is said, has been retained. As heretofore the work is issued in three volumes, the subject-matter contained in Volumes I and II relating to the work of the mechanical engineer and shipbuilder and that in Volume III to that of the building engineer. Entire sections in each of the three volumes are said to have been revised and enlarged according to the latest practice and, in some cases, matter relating to certain subjects has been transferred from one volume to another for purposes of easier comparison. In all three volumes, each chapter has been compiled by a specialist in the subject discussed. The Contents are: Band I, Mathematik; Mechanik starrer Körper; Mechanik tropfbar flüssiger Körper; Mechanik luftförmiger Körper; Wärme; Festigkeitslehre; Stoffkunde; Maschinenteile; Anhang; Sachverzeichnis. Band II, Kraftmaschinen; Messkunde; Arbeitsmaschinen; Schiffbau und Schiffsmaschinenbau; Automobil; Beleuchtung; Elektrotechnik; Sachverzeichnis. Band III, Vermessungskunde; Statik der Baukonstruktionen; Grundbau; Eisenbetonbau; Hochbau; Lüftung und Heizung; Fabrikanlagen; Baumaschinen; Wasserbau; Wasserkraftanlagen; Strassenbau; Städtebau; Wasserversorgung; Städteentwässerung; Eisenbahnwesen; Brückenbau; Sachverzeichnis.

#### MANUAL DEL INGENIERO.

Por John C. Trautwine. Revisado por John C. Trautwine, Jr., Assoc. Am. Soc. C. E., y John C. Trautwine, 3d. Traducido de la 19ª Edición (1913) y Convertido al Sistema Métrico por A. Smith. Leather,  $7 \times 5$  in., illus., 1273 pp. Paris, Casa Editorial Garnier Hermanos; 45 Broadway, New York City, Alberto Smith, 1915. \$5.00. (Donated by Dr. Smith.)

With the object of adding valuable information to the science of construction engineering and of supplying a long-felt need, on the part of Spanish and Spanish-American engineers, of practical, authentic, and up-to-date information as to American engineering methods, specifications, etc., Dr. Smith, a few years ago, undertook this translation into Spanish of Trautwine's well known "Engineers' Pocket-Book." As stated in the secondary title, the translator has used the 1913 edition of the "Pocket-Book" and by following the English text closely has made the translation practically the same as the original as to typography, material, chapters, etc., except the necessary changes of the formulas and tables from the English to the metric system. It is hoped that the "Manual" will prove of value



to Spanish and Spanish-American engineers, as well as to English and American engineers working in Spanish-American countries. The Contents are: Matemáticas; Fenómenos Naturales; Mecánica, Fuerza Aplicada á los Cuerpos Rígidos; Resistencia de Materiales; Hidrostática; Hidráulica; Construcciones, etc.; Abasto de Agua; Taladros; Tracción; Armaduras; Puentes Colgantes; Roblones y Roblonadura; Ferrocarriles; Material Rodante; Materiales; Logaritmos de las Funciones Trigonométricas; Concreto; Cemento Armado.

#### **CALCULUS MADE EASY:**

Being a Very-Simplest Introduction to Those Beautiful Methods of Reckoning Which are Generally Called by the Terrifying Names of the Differential Calculus and the Integral Calculus. By F. R. S. Second Edition, Enlarged. Cloth, 7 x 4 $\frac{3}{4}$  in., illus., 11 + 265 pp. London, Macmillan and Co., Limited, 1914. 65 cents. (Donated by The Macmillan Company.)

It is stated in the prologue that most men who write textbooks of advanced mathematics, usually solve the problems by the most difficult methods, and seldom trouble to explain how easy the calculations are. The author's aim in this book is to enable beginners to learn the language of calculus, to acquire familiarity with its simplicities, and to grasp the methods of solving problems without going through the intricate mathematical gymnastics generally used by mathematicians and authors of mathematical textbooks. In this, the second edition, a number of worked examples and exercises have been included, and certain parts of the first edition, in which further explanation was found necessary, have been enlarged. At the end of each chapter exercises and examples pertaining to the subject-matter discussed, have been included, and at the end of the book the author has given the worked out answers to these problems. The Chapter headings are: To Deliver You From the Preliminary Terrors; On Different Degrees of Smallness; On Relative Growings; Simplest Cases; Next Stage; What to do with the Constants; Sums, Differences, Products, and Quotients; Successive Differentiation; When Time Varies; Introducing a Useful Dodge; Geometrical Meaning of Differentiation; Maxima and Minima; Curvature of Curves; Other Useful Dodges; On True Compound Interest and the Law of Organic Growth; How to Deal with Sines and Cosines; Partial Differentiation; Integration; Integrating as the Reverse of Differentiating; On Finding Areas by Integrating; Dodges, Pitfalls, and Triumphs; Finding Some Solutions; Epilogue and Apologue; Table of Standard Forms; Answers to Exercises.

#### **PRINCIPLES OF DEPRECIATION.**

By Earl A. Saliers. (Ronald Accounting Series.) Three-quarters Leather, 8 $\frac{3}{4}$  x 6 in., illus., 200 pp. New York, The Ronald Press Company, 1915. \$2.50.

In this book, the author, it is said, has discussed fully the subject of depreciation as a factor in valuation and in its relation to Government supervision of business with particular reference to the income tax. He has summarized the theoretical and legal conditions of the subject, a knowledge of which is said to be necessary to apply the mathematical formulas required in calculating depreciation charges, together with the relations of the various Federal commissions and courts in regard to valuations, quoting from various decisions rendered in this connection. The various methods of determining depreciation are also described, and full explanations of the algebraic formulas used for that purpose as well as illustrations by solved problems and graphic charts are included. In the Appendix the author explains the use of logarithms in connection with valuation problems and gives a short bibliography of the general subject of depreciation. The Contents are: Part I, Theory: Character of Industrial Plant; Analysis of a Hydroelectric Plant; The Plant Ledger; Depreciation Reserves vs. Depreciation Funds; Depreciation and Efficiency. Part II, Practical Applications: Regulation by Courts and Commissions; The Income Tax; Valuations; Land in Valuations. Part III, Determining the Depreciation Charge: Methods of Depreciation; The Straight-Line Method; The Reducing Balance Method; The Sinking Fund Method; The Annuity Method; The Equal-Annual-Payment Method; The Unit Cost Method. Appendix: Logarithms and Their Use; Selected Bibliography; Index.

Gifts have also been received from the following:

Alabama-State Highway Dept. 2 pam.	Alaska Treadwell Gold Min. Co. 1 pam.
Alabama & Vicksburg Ry. Co. 6 pam.	Alaska United Gold Min. Co. 1 pam.
Alabama Assoc. of Highway Engrs. 1 pam.	Albany, N. Y.-Bureau of Water. 1 pam.
	Albany, N. Y.-City Engr. 1 pam.
Alaska Mexican Gold Min. Co. 1 pam.	Albany Soc. of Civ. Engrs. 1 pam.



- Alexandria Water Co. 1 pam.  
 Allen, W. F. 1 pam.  
 Am. Assoc. of Port Authorities. 1 vol.  
 Am. Chemical Soc. 1 pam.  
 Am. Concrete Inst. 1 bound vol.  
 Am. Inst. of Cons. Engrs. 1 bound vol.  
 Am. Inst. of Elec. Engrs. 1 pam.  
 Am. Inst. of Min. Engrs. 1 bound vol., 1 vol.  
 Am. Iron and Steel Inst. 1 vol.  
 Am. Telephone & Telegraph Co. 2 vol., 14 pam.  
 Am. Wood Preservers' Assoc. 1 bound vol., 2 vol.  
*Architectural Record, The.* 1 pam.  
 Arizona-State Tax Comm. 2 pam.  
 Assam, India-Public Works Dept. 1 pam.  
 Associação dos Engenheiros Cívis Portugueses. 1 pam.  
 Associated Factory Mutual Fire Insurance Cos. 1 pam.  
 Assoc. of Dominion Land Surveyors. 1 pam.  
 Assoc. of Ontario Land Surveyors. 1 vol.  
 Atlanta, Ga.-City Comptroller. 1 pam.  
 Australasian Inst. of Min. Engrs. 1 pam.  
 Australia-Interstate Comm. 8 pam.  
 Australia-Interstate Conference on Artesian Water. 1 bound vol.  
 Bihar and Orissa, India-Public Works Dept. 1 bound vol.  
 Birmingham, England-Water Committee. 1 pam.  
 Blanchard, Arthur H. 1 bound vol.  
 Bombay Presidency, India-Public Works Dept. 1 vol.  
 Boston Soc. of Civ. Engrs. 1 pam.  
 Bridgeport, Conn.-City Plan Comm. 1 pam.  
 Brockton, Mass.-City Engr. 1 pam.  
 Brooklyn, N. Y.-Borough President. 2 bound vol.  
 Bureau of Ry. Economics. 2 pam.  
 Cadillac, Mich.-Charter Comm. 1 pam.  
 California-Agricultural Exper. Station. 1 pam.  
 California-Board of State Harbor Commrs. 1 pam.  
 California-Dept. of Eng. 3 vol., 1 pam.  
 California-R. R. Comm. 1 map.  
 Cambridge, Mass.-City Council. 1 bound vol.  
 Cambridge, Mass.-City Engr. 1 pam.  
 Canada-Board of Ry. Commrs. 1 vol., 1 pam.  
 Canada-Comm. of Conservation. 1 pam.  
 Canada-Dept. of Mines. 1 vol., 3 pam.  
 Canada-Dept. of the Interior. 1 vol.  
 Canada-Geol. Survey. 1 bound vol., 7 vol., 1 pam.  
 Canada-Mines Branch. 1 bound vol., 4 vol., 3 pam.  
 Carnegie Endowment for International Peace. 13 pam.  
 Carnegie Steel Co. 2 pam.  
 Case, Gerald O. 3 pam.  
 Central States Water Works Assoc. 4 pam.  
 Chemin de Fer de Paris à Orléans. 1 pam.  
 Chemin der Fer Metropolitan de Paris. 1 pam.  
 Chemins de Fer de l'Est. 1 pam.  
 Chemins de Fer de Paris à Lyon et à la Méditerranée. 1 pam.  
 Chesapeake & Ohio Ry. Co. 1 pam.  
 Chicago, Ill.-Bureau of Eng. 1 pam.  
 Chicago, Ill.-Bureau of Public Efficiency. 1 pam.  
 Chicago, Ill.-Mayor. 1 bound vol.  
 Chicago Junction Rys. & Union Stock Yards Co. 1 pam.  
 Cincinnati, Ohio-Water-Works Dept. 1 pam.  
 Cincinnati, New Orleans & Texas Pacific Ry. Co. 1 pam.  
 City Managers' Assoc. 1 pam.  
 Civil Engrs.' Soc. of St. Paul. 1 pam.  
 Cleveland, Ohio-City Council. 1 pam.  
 Cleveland Eng. Soc. 2 vol.  
 Clinton Fireproofing Co. 1 pam.  
 Colorado-Public Utilities Comm. 8 pam.  
 Colorado-State Agricultural Coll. 1 pam.  
 Colorado-State Highway Comm. 1 pam.  
 Colorado School of Mines. 1 pam.  
 Colorado, Univ. of. 1 pam.  
 Columbia Univ. 4 pam.  
 Concrete Inst. 1 vol.  
 Concrete Steel Products Co. 1 pam.  
 Connecticut-Agricultural Exper. Station. 6 pam.  
 Connecticut-State Geol. and Natural History Survey. 1 vol., 1 pam.  
 Connecticut Soc. of Civ. Engrs. 1 vol.  
 Cooke, Morris Llewellyn. 1 pam.  
 Copper Range Consolidated Co. 1 pam.  
 Corthell, Elmer L. 1 pam.  
 Council Bluffs, Iowa-Board of Water-Works Trustees. 2 pam.  
 Davies, J. Vipond. 1 pam.  
 Dayton, Ohio-Bureau of Municipal Research. 1 pam.  
 Decauville, Paul. 2 pam.  
 Detroit, Mich.-Board of Health. 1 pam.  
 District of Columbia-Public Utilities Comm. 1 pam.  
 Dooling, Peter J. 2 vol.  
 Duluth, South Shore & Atlantic Ry. Co. 3 pam.  
 Düsseldorf, Germany - Betriebe - Direktion der Strassenbahnen. 1 pam.  
 East Indian Ry. Co. 1 pam.  
 Engrs. Club of Cincinnati. 1 pam.  
 Engrs. Club of Dayton. 1 pam.  
 Engrs. Club of Trenton. 3 pam.  
 Engrs. Soc. of Pennsylvania. 1 pam.  
 Erie & Pittsburgh R. R. Co. 2 pam.  
 Felt, E. P. 1 pam.  
 Fidelity & Casualty Co. 2 pam.  
 Fitchburg, Mass.-City Clerk. 1 bound vol.  
 Fitchburg, Mass.-Sewage Disposal Comm. 2 pam.  
 Florida-State Health Officer. 1 vol.  
 Florida, Univ. of. 1 vol.  
 Foley, James A. 1 bound vol., 1 pam.  
 Folkestone, England-Medical Officer of Health. 1 pam.  
 Frost, W. H. 1 pam.  
 Geological Soc. of America. 1 pam.  
 Gloucester, Mass.-Board of Water Commrs. 1 pam.  
 Gloucester, Mass.-City Clerk. 1 bound vol.  
 Goldschmidt Thermit Co. 1 pam.  
 Great Indian Peninsula Ry. Co. 1 pam.  
 Great Northern Ry. Co. 11 pam.  
 Hadfield, Robert A. 2 pam.  
 Hassam Paving Co. 2 pam.  
 Haupt, Lewis M. 1 pam.  
 Haverhill, Mass.-Board of Water Commrs. 1 pam.

- Hawaii Coll. 2 pam.  
 Hickerson, T. F. 1 pam.  
 Higgins, Charles Houghin. 1 pam.  
 Hobson, R. P. 2 pam.  
 Holyoke, Mass.-Board of Water Commrs. 2 pam.  
 Holyoke, Mass.-City Engr. 1 pam.  
 Houston, John J. L. 8 bound vol., 3 pam.  
 Idaho-State Board of Health. 1 pam.  
 Illinois-Canal Commrs. 1 pam.  
 Illinois-Dept. of Factory Inspection. 1 vol.  
 Illinois-Secy. of State. 1 pam.  
 Illinois Coal Min. Investigations. 3 pam.  
 Illinois Soc. of Engrs. and Surveyors. 1 pam.  
 Illinois Southern Ry. Co. 2 pam.  
 Illinois, Univ. of-Agricultural Exper. Station. 1 pam.  
 India-Public Works Dept. 1 pam.  
 Indiana-State Board of Health. 1 vol.  
 Indiana Academy of Science. 2 vol.  
 Indiana San. and Water Supply Assoc. 1 vol.  
 Indiana State Library. 1 pam.  
 Institution of Civ. Engrs. 1 bound vol., 2 vol.  
 Institution of Engrs. and Shipbuilders. 1 bound vol.  
 Institution of Mech. Engrs. 1 vol.  
 Iowa Eng. Soc. 1 pam.  
 Iowa State Coll. of Agriculture and Mechanic Arts. 2 vol.  
 Iowa, Univ. of. 2 pam.  
 Isle of Wight Ry. Co. 2 pam.  
 John Crerar Library. 1 pam.  
 Johns Hopkins Univ. 1 vol.  
 Kansas-State Board of Agriculture. 1 bound vol.  
 Kentucky, Univ. of. 2 vol.  
 Koninklijk Instituut van Ingenieurs. 1 pam.  
 Lackawanna Steel Co. 1 pam.  
 Lancashire & Yorkshire Ry. Co. 5 pam.  
 LeBaron, J. Francis. 1 pam.  
 Lederer, Arthur. 2 pam.  
 Lewis, Nelson P. 1 vol.  
 Liverpool Eng. Soc. 1 vol.  
 London, England-Battersea Borough Council. 1 bound vol.  
 London, England-Croydon Borough Council. 2 bound vol.  
 London, England-Middleton Borough, Medical Officer. 1 pam.  
 London, England-St. Pancras Borough Council. 1 bound vol.  
 London, England-Wandsworth Borough Council. 1 bound vol.  
 London, Ont.-Public Utilities Comm. 1 pam.  
 London & South Western Ry. Co. 2 pam.  
 Los Angeles, Cal.-Dept. of Public Utilities. 1 pam.  
 Louisiana-State Board of Health. 1 vol.  
 Louisiana & Arkansas Ry. Co. 4 pam.  
 Lucas County, Ohio-Dept. of San. Eng. 1 pam.  
 McCaustland, E. J. 1 pam.  
 McGill Univ. 1 bound vol.  
 McNulty, G. W. 58 bound vol., 2 vol., 2 pam.  
 Madras, India-Public Works Dept. 1 vol., 1 pam.  
 Mahoning Coal R. R. Co. 3 pam.  
 Maine-State Auditor. 1 bound vol.  
 Maine-State Highway Comm. 1 bound vol.  
 Maine-State Treas. 1 bound vol.  
 Maine Soc. of Civ. Engrs. 1 pam.  
 Marlborough, Mass.-Water and Sewage Commrs. 1 vol.  
 Maryland-State Board of Forestry. 7 pam.  
 Maryland-State Roads Comm. 4 pam.  
 Massachusetts-Agricultural Exper. Station. 16 pam.  
 Massachusetts-Board of Gas and Electric Light Commrs. 1 vol.  
 Massachusetts-Board of Harbor and Land Commrs. 1 bound vol.  
 Massachusetts-Comm. on Economy and Efficiency. 1 bound vol.  
 Massachusetts-Metropolitan Park Comm. 1 bound vol.  
 Massachusetts-Metropolitan Water and Sewerage Board. 2 bound vol.  
 Massachusetts-Mount Everett State Reservation Comm. 2 pam.  
 Massachusetts-Public Service Comm. 1 bound vol.  
 Mass. Inst. Tech. 1 vol., 1 pam.  
 Matamoros, Luis. 2 pam.  
 Mechanics Inst. of San Francisco. 1 pam.  
 Medford, Mass.-Water and Sewer Dept. 1 pam.  
 Melbourne, Univ. of. 6 bound vol.  
 Melrose, Mass.-Public Works Dept. 1 pam.  
 Memphis, Tenn.-Artesian Water Dept. 1 pam.  
 Michigan-R. R. Comm. 1 bound vol.  
 Michigan-State Board of Health. 1 bound vol.  
 Michigan Coll. of Mines. 1 pam.  
 Michigan, Univ. of. 1 vol., 2 pam.  
 Middleboro, Mass.-Water-Works Dept. 1 pam.  
 Minneapolis, Minn.-Board of Park Commrs. 1 pam.  
 Minnesota-Tax Comm. 1 bound vol.  
 Minnesota, Univ. of. 24 vol., 5 pam.  
 Mississippi Agricultural and Mech. Coll. 1 vol.  
 Mississippi River Comm. 1 pam.  
 Missouri-Bureau of Geol. and Mines. 1 bound vol.  
 Missouri-Public Service Comm. 1 vol., 1 pam.  
 Missouri-Secy. of State. 1 pam.  
 Missouri Pacific Ry. Co. 1 pam.  
 Moore, Lewis Eugene. 1 pam.  
 Morse, Robert B. 1 pam.  
 Municipal Engrs. of the City of New York. 1 pam.  
 Murray, E. B. 1 pam.  
 Nashville, Tenn.-Board of Commrs. 1 pam.  
 National Assoc. of Cotton Mfrs. 1 vol., 1 pam.  
 National Board of Fire Underwriters. 1 bound vol., 62 pam.  
 National Conference on City Planning. 3 pam.  
 National Fire Protection Assoc. 1 vol.  
 National Lime Mfrs. Assoc. 1 vol.  
 Nebraska-Agricultural Exper. Station. 1 pam.  
 Nebraska-Water Comm. 1 pam.  
 Nebraska, Univ. of. 1 vol., 1 pam.  
 Nevada-State Board of Health. 1 pam.  
 Nevada-State Engr. 3 pam.  
 New England Water Works Assoc. 1 pam.  
 New Hampshire-Public Service Comm. 1 bound vol., 2 pam.

- New Jersey-Agricultural Exper. Station. 2 pam.  
 New Jersey-Board of Equalization of Taxes. 1 pam.  
 New Jersey-Board of Tenement House Supervision. 1 pam.  
 New Jersey-Bureau of Industrial Statistics. 1 bound vol.  
 New Jersey-Commr. of Public Roads. 1 bound vol.  
 New Jersey-Comptroller. 1 bound vol.  
 New Jersey-Geol. Survey. 2 bound vol.  
 New Jersey-State Board of Health. 1 pam.  
 New Mexico, Univ. of. 1 pam.  
 New Orleans, La.-Board of Commrs. of the Port of New Orleans. 1 bound vol., 7 pam.  
 New Orleans & Northeastern R. R. Co. 2 pam.  
 New South Wales-Dept. of Public Works. 1 vol.  
 New South Wales-Metropolitan Board of Water Supply and Sewerage. 1 vol.  
 New South Wales-Water Conservation and Irrig. Comm. 1 vol.  
 New York City-Board of Water Supply. 1 bound vol.  
 New York City-Committees on the City Plan. 1 vol.  
 New York City-Dept. of Health. 2 bound vol., 1 pam.  
 New York City-Dept. of Street Cleaning. 1 pam.  
 New York City-Heights of Bldgs. Comm. 1 bound vol.  
 New York State-Commrs. of State Reservation at Saratoga Springs. 1 pam.  
 New York State-Commrs. of the Palisades Interstate Park. 1 pam.  
 New York State-Comptroller. 1 bound vol.  
 New York State-Constitutional Convention. 220 pam.  
 New York State-Dept. of State Engr. and Surv. 1 bound vol.  
 New York State-Health Officer of the Port of New York. 1 bound vol., 1 pam.  
 New York State-Industrial Board. 1 pam.  
 New York State-Public Service Comm., First Dist. 2 bound vol., 3 pam.  
 New York State-Public Service Comm., Second Dist. 1 bound vol., 7 pam.  
 New York-Secy. of State. 1 bound vol.  
 New York-State Dept. of Health. 1 bound vol.  
 New York-State Library. 3 pam.  
 New York, Chicago & St. Louis R. R. Co. 1 pam.  
 New York Public Library. 1 pam.  
 New Zealand-Govt. Statistician. 1 bound vol.  
 Newark, N. J.-City Plan Comm. 1 pam.  
 North Carolina-Board of Internal Impvts. 1 pam.  
 North Carolina-Geol. and Economic Survey. 1 vol.  
 North Carolina-State Board of Health. 1 pam.  
 North Dakota-Agricultural Exper. Station. 1 pam.  
 North-East Coast Inst. of Engrs. and Shipbuilders. 1 bound vol.  
 Northampton, Mass.-Board of Water Commrs. 1 pam.  
 Ogden City, Utah-City Auditor. 1 pam.  
 Ohio-Agricultural Exper. Station. 3 pam.  
 Ohio-Dept. of Public Instruction. 3 pam.  
 Ohio-Industrial Comm. 2 pam.  
 Ohio-Legislative Reference Dept. 1 pam.  
 Ohio-Secy. of State. 1 bound vol.  
 Ohio-State Board of Health. 1 vol.  
 Ohio-State Highway Dept. 9 pam.  
 Ohio Soc. of Mech., Elec., and Steam Engrs. 1 pam.  
 Oklahoma-Corporation Comm. 1 map.  
 Oklahoma, Univ. of. 1 vol., 1 pam.  
 Oregon-Bureau of Mines and Geology. 1 pam.  
 Oregon-State Board of Health. 1 pam.  
 Oregon-State Immigration Comm. 2 vol.  
 Pacific Highway Assoc. 1 pam.  
 Pacific Light & Power Corporation. 1 pam.  
 Paint Mfrs. Assoc. of the United States. 2 pam.  
 Pennsylvania-Dept. of Agriculture. 1 vol.  
 Pennsylvania-Dept. of Forestry. 1 bound vol.  
 Pennsylvania-Dept. of Health. 7 pam.  
 Pennsylvania-Public Service Comm. 1 bound vol., 36 pam.  
 Pennsylvania-State Highway Dept. 1 pam.  
 Pennsylvania-Topographic and Geol. Survey. 3 bound vol., 1 pam.  
 Pennsylvania State Coll. 1 vol.  
 Peru-Cuerpo de Ingenieros de Minas. 1 pam.  
 Philadelphia, Pa.-Bureau of Surveys. 1 bound vol.  
 Philippine Islands-Bureau of Forestry. 2 pam.  
 Philippine Islands-Dept. of Finance and Justice. 1 pam.  
 Philippine Islands-Div. of Mines. 1 vol.  
 Philippine Islands-Weather Bureau. 1 vol.  
 Pittsburgh, Pa.-Bureau of Water. 1 pam.  
 Pittsburgh, Pa.-Carnegie Library. 1 pam.  
 Pittsburgh, Cincinnati, Chicago & St. Louis Ry. Co. 2 pam.  
 Pittsburgh, Fort Wayne & Chicago Ry. Co. 20 pam.  
 Porto Rico-Dirección de Sanidad. 1 pam.  
 Presidents Conference Committee. 37 pam.  
 Princeton Univ. 1 pam.  
 Punjab, India-Irrig. Dept. 1 bound vol.  
 Quebec, Canada-Bureau des Mines. 1 vol.  
 Quebec, Canada-Service des Mines. 1 vol.  
 Rensselaer Soc. of Engrs. 2 pam.  
 Rhode Island-Public Utilities Comm. 1 pam.  
 Rhode Island-Secy. of State. 1 bound vol.  
 Rhodesia Rys. Co., Ltd. 1 pam.  
 Royal Canadian Inst. 1 vol.  
 Royal Sanitary Inst. 1 pam.  
 Royal Societies Club. 1 bound vol.  
 Royal Soc. of Arts. 1 pam.  
 St. Francis Levee Board of Arkansas. 9 pam.  
 St. Paul, Minn.-Board of Water Commrs. 1 pam.  
 San Diego, Cal.-Dept. of Water, Pueblo Lands, and Forestry. 1 pam.  
 Sanderson & Porter. 1 pam.  
 Sarle, O. Perry. 1 pam.  
 Scaife, Wm. B. & Sons Co. 1 bound vol., 1 pam.  
 Seattle Assoc. of Members of the Am. Soc. of Civ. Engrs. 1 pam.

- Sharon Ry. Co. 2 pam.  
 Smithsonian Institution. 3 pam.  
 Soc. for the Promotion of Eng. Education. 2 bound vol.  
 Soc. of Engrs. 1 pam.  
 Soc. of Naval Archts. and Marine Engrs. 1 bound vol.  
 South Dakota-Dept. of History. 6 pam.  
 Spofford, Charles M. 1 pam.  
 Spokane, Wash.-City Auditor. 1 pam.  
 Springfield, Mass.-City Planning Comm. 1 pam.  
 Swaab, S. M. 1 pam.  
 Swedish Engrs.' Soc. of Chicago. 1 pam.  
 Tasmania-Engr.-in-Chf., Public Works Dept. 1 pam.  
 Technical Soc. of the Pacific Coast. 1 pam.  
 Tennessee-Min. Dept. 1 pam.  
 Tennessee, Univ. of. 1 vol., 2 pam.  
 Texas Agricultural and Mech. Coll. 2 pam.  
 Texas Assoc. of Members of the Am. Soc. of Civ. Engrs. 5 pam.  
 Texas, Univ. of. 4 pam.  
 Throop Coll. of Technology. 1 pam.  
 Tokyo Imperial Univ. 1 vol.  
 Toronto, Univ. of. 2 pam.  
 Union League of Philadelphia. 1 pam.  
 U. S.-Bureau of Entomology. 1 pam.  
 U. S.-Bureau of Foreign and Domestic Commerce. 1 bound vol., 2 pam.  
 U. S.-Bureau of Insular Affairs. 1 bound vol.  
 U. S.-Bureau of Labor Statistics. 1 vol., 1 pam.  
 U. S.-Bureau of Mines. 9 pam.  
 U. S.-Bureau of Standards. 1 vol., 1 pam.  
 U. S.-Bureau of Steam Eng. 1 pam.  
 U. S.-Bureau of the Census. 4 bound vol., 2 vol., 4 pam.  
 U. S.-Chf. of Engrs. 1 vol., 6 pam.  
 U. S.-Civ. Service Comm. 1 bound vol.  
 U. S.-Coast and Geodetic Survey. 11 pam., 2 maps.  
 U. S.-Dept. of Agriculture. 1 pam.  
 U. S.-Dept. of the Interior. 2 pam., 2 sheets.  
 U. S.-Gen. Land Office. 29 maps.  
 U. S.-Geol. Survey. 1 bound vol., 31 pam.  
 U. S.-International Joint Comm. 1 vol., 2 pam.  
 U. S.-Interstate Commerce Comm. 2 bound vol., 3 pam.  
 U. S.-Lake Survey Office. 2 pam.  
 U. S.-National Museum. 1 bound vol., 2 vol., 1 pam.  
 U. S.-Office of Exper. Stations. 5 pam.  
 U. S.-Office of Public Roads. 1 pam.  
 U. S.-Ordinance Dept. 1 bound vol.  
 U. S.-Surgeon-General. 3 vol.  
 U. S.-Weather Bureau. 1 bound vol., 1 pam.  
 Universidad Nacional de la Plata. 1 vol., 1 pam.  
 University Club. 1 bound vol.  
 Utah-State Board of Health. 1 pam.  
 Utah, Univ. of. 1 vol.  
 Valencia, Spain-Director de las Obras del Puerto. 1 bound vol.  
 Vancouver, B. C.-Civic Center Committee. 1 pam.  
 Vandalia R. R. Co. 1 pam.  
 Vermont-State Forester. 1 pam.  
 Vermont, Univ. of. 1 vol.  
 Victoria-County Roads Board. 1 pam.  
 Wallace, John F. 1 pam.  
 Waltham, Mass.-Water Dept. 1 pam.  
 Washington-Dept. of State. 1 pam.  
 Washington-Geol. Survey. 2 bound vol.  
 Washington, Univ. of. 1 pam.  
 Waterbury, Conn.-City Engr. 1 pam.  
 Wellington, New Zealand-Harbour Board. 1 pam.  
 West Virginia-Geol. Survey. 1 bound vol., 2 pam., 1 map.  
 Western Australia-Geol. Survey. 4 vol.  
 Western Soc. of Engrs. 1 pam.  
 Western Univ. 1 pam.  
 Whitney, Francis N. 1 pam.  
 Wilmington, Del.-Board of Park Commrs. 1 pam.  
 Wisconsin-Geol. and Natural History Survey. 4 bound vol.  
 Wisconsin-Highway Comm. 1 bound vol., 1 pam.  
 Wisconsin-R. R. Comm. 1 bound vol.  
 Wisconsin-State Board of Health. 2 vol.  
 Wisconsin, Univ. of. 1 vol.  
 Woonsocket, R. I.-Water Dept. 1 pam.  
 Workington, England-Town Clerk. 1 pam.

### BY PURCHASE

**Principles and Practice of Plumbing.** By J. J. Cosgrove. Pittsburgh, 1914.

**Case-Hardening of Steel:** An Illustrated Exposition of the Changes in Structure and Properties Induced in Mild Steels by Cementation and Allied Processes. By Harry Brearley. London, 1914.

**Levelling and its General Application.** By Thomas Holloway. Third Edition. London and New York, 1914.

**Dynamics of Surfaces:** An Introduction to the Study of Biological Surface Phenomena. By Leonor Michaelis. London and New York, 1914.

**Experiences in Efficiency.** By Benjamin A. Franklin. New York, 1915.

**Diagram Giving Stresses in Beams.** By H. R. Thayer. New York, 1910.

**New International Year Book:** A Compendium of the World's Progress for the Year 1914. New York, 1915.

**Panama Canal, Gamboa Reach to Panama Bay (Chart):** From Isthmian Canal Commission and Other United States Government Surveys, 1914.

**Panama Canal, Limon Bay to Gamboa Reach (Chart):** From Isthmian Canal Commission and Other United States Government Surveys, 1914.

**Calculus for Engineers.** By Ewart S. Andrews and H. Bryon Heywood. London and New York, 1914.

**Gaseous Impurities in the Air of Railway Tunnels.** By Atherton Seidell and Philip W. Meserve. (U. S.-Hygienic Laboratory-Bulletin No. 92.) Washington, 1914.

**Interstate Commerce Commission Cases** in the Federal Courts, 1887 to 1914. Second Edition. Washington, 1915.

**Public Utilities:** Their Fair Present Value and Return. By Hammond V. Hayes. New York, 1915.

**Naval Ordnance:** A Text-Book Prepared for the Use of the Midshipmen of the United States Naval Academy by the Officers of the United States Navy; Revised by Roland I. Curtin and Thomas L. Johnson. Annapolis, 1915.

**Naval Construction:** Prepared for the Use of the Midshipmen of the United States Naval Academy. By R. H. M. Robinson. Third Edition. Annapolis, 1914.

**Examination of Water** for Sanitary and Technic Purposes. By Henry Leffmann. Seventh Edition. Philadelphia, 1915.

**Explosives:** Their Manufacture, Properties, Tests and History. By Arthur Marshall. Philadelphia, 1915.

**Stahl und Eisen:** Zeitschriftenschau. Düsseldorf, 1915.

**Methods of Metallurgical Analysis.** By Charles H. White. New York, 1915.

**Manufacture of Paint:** A Practical Handbook for Paint Manufacturers, Merchants, and Painters. By J. Cruickshank Smith. Second Edition. London and New York, 1915.

**Preventing Losses in Factory Power Plants.** By David Moffat Myers. New York, 1915.

**District Heating:** A Brief Exposition of the Development of District Heating and Its Position Among Public Utilities. By S. Morgan Bushnell and Fred B. Orr. New York, 1915.

**National Brick Manufacturers' Association:** Official Reports of the 21st-28th Annual Conventions, 1907-14. Indianapolis.

**Great Britain-Royal Commission on Sewage Disposal:** Ninth and Final Report of the Commissioners Appointed to Inquire and Report What Methods of Treating and Disposing of Sewage may Properly be Adopted. London, 1915.

**United States-Alaska Road Commission:** Report, 1909. Washington, 1910.

**American Road Congress:** Papers, Addresses and Resolutions Before the Congress, Richmond, Va., November 20th-23d, 1911.

**American Road Congress:** Proceedings of Third Congress Under Auspices of American Highway Association, American Automobile Association, Detroit, Mich., September 29th-October 4th, 1913.

**American Highway Association:** Bulletins 1-8; 1912.

**Poor's Manual of Public Utilities:** Street, Railway, Gas, Electric, Water, Power, Telephone, and Telegraph Companies, 1915. New York, 1915.

**Neue Grundlagen der Logik, Arithmetik, und Mengenlehre.** Von Julius König. Leipzig, 1914.

**Abwasserreinigungsanlagen;** Ihre Leistungen und Ihre Kontrolle vom Chemisch-Praktischen Standpunkt. Von K. Thumm. Berlin, 1914.

**Stamp Milling and Cyaniding.** By Francis Andrew Thomson. New York and London, 1915.

**Dielectric Phenomena in High Voltage Engineering.** By F. W. Peek, Jr. New York and London, 1915.

**Fleets of the World:** Compiled from Official Sources and Classified According to Types. Philadelphia and London, 1915.

#### SUMMARY OF ACCESSIONS

(From May 4th to July 24th, 1915)

Donations (including 78 duplicates).....	1 294
By purchase.....	50
Total .....	1 344



## MEMBERSHIP

(From May 7th to August 5th, 1915)

## ADDITIONS

MEMBERS		Date of Membership.
ALMERT, HAROLD. Cons. Engr., The Rookery, Chicago, Ill..	June	3, 1915
BARCLAY, ALEXANDER JAMES. Asst. to Chf. Engr., S. P. Co., East Auburn, Cal.....	June	3, 1915
BARLOW, JAMES EVANS. Director of Public Service, City Bldg., Dayton, Ohio.....	Jun.	Sept. 4, 1906
	Assoc. M.	Mar. 1, 1910
	M.	May 5, 1915
BRANCH, THOMAS PETTUS. Prof. of Civ. Eng., Georgia School of Technology, Atlanta, Ga.....	Assoc. M.	Feb. 5, 1902
	M.	May 5, 1915
BRATAGER, STOERK JOHAN. Prin. Asst. Engr., N. P. Ry., St. Paul, Minn.....	June	3, 1915
BUCK, CON MORRISON. Div. Engr., A., T. & S. F. Ry., 322 Greenwood Ave., Topeka, Kans. ....	Assoc. M.	Dec. 6, 1905
	M.	Mar. 2, 1915
BURROUGHS, HECTOR ROBINS. Cons. Engr. (Weiskopf & Burroughs), 68 William St., New York City.....	Jun.	Mar. 3, 1908
	Assoc. M.	Sept. 6, 1910
	M.	July 7, 1915
CLARK, FREDERICK HOWE. Supt. of Streets and Eng., City Hall, Springfield, Mass.....	June	3, 1915
CRAIN, ARTHUR MANCHESTER. 910 Dime Sav- ings Bank Bldg., Detroit, Mich.....	Jun.	Jan. 3, 1907
	Assoc. M.	Dec. 1, 1908
	M.	July 7, 1915
DATZ, LOUIS CHRISTIAN. Engr., United Gas & Elec. Eng. Corporation, 201 Baronne St., New Orleans, La.....	Assoc. M.	June 30, 1911
	M.	Mar. 2, 1915
DENT, ELLIOTT JOHNSTONE. Maj., Corps of Engrs., U. S. A., 707 Army Bldg., New York City.....	Assoc. M.	May 1, 1907
	M.	July 7, 1915
DOOLITTLE, HAROLD JAMES. Highway Engr., State Highway Dept., Colfax, Wash....	Assoc. M.	June 6, 1911
	M.	July 7, 1915
EHRBAR, LOUIS HARVEY. Engr. in Chg., Sub- way Constr., New York Telephone Co., 281 Washington St., Newark, N. J....	Assoc. M.	May 2, 1906
	M.	May 5, 1915
EMERSON, CHARLES ALVIN, JR. Acting Chf. Engr., State Dept. of Health, Harris- burg, Pa.....	Assoc. M.	June 30, 1911
	M.	July 7, 1915
FRISBY, EDGAR RAYMOND. Chf., Computing Div., U. S. Coast and Geodetic Survey, Manila, Philippine Islands....	April	7, 1915
GILDERSLEEVE, ALGER CROCHERON. Cons. Engr., 622 West 113th St., New York City.....	Jun.	Feb. 6, 1894
	Assoc.	April 4, 1899
	M.	May 5, 1915

MEMBERS ( <i>Continued</i> )		Date of Membership.	
GILMORE, THOMAS NIXON. Chf. Engr., Westinghouse, Church, Kerr & Co., 37 Wall St., New York City..		April	7, 1915
GRANT, LLOYD MURRAY. Chf. Engr., Pacific Coast Pipe Co., Ballard Station, Seattle, Wash.....	} Assoc. M. M.	Sept.	5, 1911
		July	7, 1915
GROVER, OSCAR LLEWELLYN. Bridge Engr., Office of Public Rds., U. S. Dept. of Agriculture, Washington, D. C.....	} Assoc. M. M.	Mar.	2, 1909
		Mar.	2, 1915
HAGEMAN, HARRY ANDREW. Hydr. Engr., Stone & Webster Eng. Corporation, 147 Milk St., Boston, Mass....		April	7, 1915
HAYWARD, HARRISON WASHBURN. Cons. Engr.; Associate Prof., Applied Mechanics, Mass. Inst. Tech., Boston, Mass.....	} Assoc. M.	June	6, 1906
		May	5, 1915
HELLAND, HANS. City Engr., 1109 McCullough Ave., San Antonio, Tex.....		June	3, 1915
MACMARTIN, JAMES MACGREGOR. Chf. Engr., The Delaware & Hudson Co. and Wilkes-Barre Connecting R. R., General Offices, Delaware & Hudson Co., Foot of State St., Albany, N. Y.....		June	3, 1915
McCLAVE, STEPHEN WOOD, JR. Cons. Engr. (McClave & McClave), 1 Madison Ave., New York City (Res., Cliffside, N. J.)..	} Jun. Assoc. M. M.	Jan.	3, 1907
		July	9, 1912
		May	5, 1915
McDOUGALL, ANDREW HORACE. Chf. Engr., Whiting Foundry Equipment Co., 119 One Hundred and Fifty-fifth St., Harvey, Ill.....		June	3, 1915
MINOR, SHELDON ELTON. Cons. Engr.; Engr., Special Greenwich Highway Comm. and Special Greenwich Sewer Comm., Lock Box 86, Greenwich, Conn.....		June	3, 1915
MOTLEY, PHILLIPS BATHURST. Engr. of Bridges, C. P. Ry., Montreal, Que., Canada.....		April	7, 1915
NELSON, ALEXANDER HOWARD. Guarantee Trust Bldg., Atlantic City, N. J.....	} Jun. Assoc. M. M.	Nov.	1, 1898
		April	5, 1905
O'CONNOR, JOHN ADAM. Terminal Engr., Barge Canal Terminals, 131 Lancaster St., Albany, N. Y.....	} Assoc. M. M.	April	1, 1908
		May	5, 1915
PARKER, PHILIP A MORLEY. Cons. Hydr. Engr., 25 Victoria St., London, S. W., England.	} Assoc. M. M.	Mar.	6, 1907
		Jan.	6, 1915
SAMPSON, GEORGE ARTHUR. Prin. Asst. to Robert Spurr Weston, 14 Beacon St., Boston, Mass.....	} Assoc. M. M.	Feb.	4, 1913
		July	7, 1915
SAUNDERS, HENRY JENNESS. Office Engr., Interstate Commerce Comm., 731 Wells Fargo Bldg., San Francisco, Cal.....	} Assoc. M. M.	May	3, 1910
		May	5, 1915

MEMBERS ( <i>Continued</i> )		Date of Membership.	
SEARLE, CHARLES DEPEW. Senior Asst. Div. Engr., Public Service Comm., First Dist., 526 West 113th St., New York City..	Assoc. M.	April	5, 1905
	M.	July	7, 1915
SHEDD, GEORGE GARNETT. Constr. Engr., 290 Lexington St., Waltham, Mass.....	Assoc. M.	Oct.	3, 1906
	M.	May	5, 1915
SHELDON, CHARLES SMITH. Engr., Bridges and Structures, P. M. R. R., 258 St. Clair Ave., Detroit, Mich.....	Assoc. M.	June	7, 1905
	M.	May	5, 1915
SNYDER, FREDERIC ANTES. Chf. Engr., Town of Mount Royal, 230 St. James St., Montreal, Que., Canada.....	Assoc. M.	June	1, 1904
	M.	May	5, 1915
STEVENS, EDWIN AUGUSTUS. State Commr. of Public Rds., State House, Trenton, N. J.....		June	3, 1915
THAYER, HORACE RICHMOND. Asst. Prof. of Structural Design, Carnegie Inst. of Technology, 6529 Aylesboro Ave., Pitts- burgh, Pa.....	Assoc. M.	Mar.	7, 1906
	M.	May	5, 1915
THEARD, ALFRED FRANCIS. Prin. Asst. Engr., Sewerage and Water Board, 506 City Hall Annex, New Orleans, La.		Mar.	2, 1915
WHITESIDE, FREDERICK WILLIAM. Chf. Engr., The Victor- Am. Fuel Co., The Colo. & S. E. R. R., The Mountain Telegraph Co.; Secy. and Treas., The Rocky Mountain Coal Min. Inst., 307 Ernest and Cranmer Bldg., Denver, Colo.....		April	7, 1915
WHITNEY, HERBERT ANGELL. Care, Whitney Eng. Co., Tacoma, Wash.....	Assoc. M.	Sept.	3, 1913
	M.	May	5, 1915
WOOD, WINTHROP BARRETT. Asst. Chf. Engr., Joseph Bancroft & Sons Co., 2214 Gilpin Ave., Wilmington, Del.....	Assoc. M.	April	6, 1904
	M.	July	7, 1915
YAPPEN, ADOLPH. Asst. Engr., C., M. & St. P. Ry., Grand and North Avenues, Chi- cago, Ill.....	Assoc. M.	June	1, 1909
	M.	July	7, 1915

## ASSOCIATE MEMBERS

ABRAMS, SYLVAIN SELIC. Asst. Civ. Engr., Dept. of Public Works, Bureau of Eng., 1848 Franklin St., San Francisco, Cal.....	June	3, 1915
ADAMS, ELMER ELLSWORTH. 212 Thirty-fifth Ave., North, Seattle, Wash.....	April	7, 1915
APPLEGARTH, GAULT. Chestertown, Md.....	Mar.	2, 1915
BOARDMAN, CLIFFORD HOLMES. (Beugler & Boardman), 811 First National Bank Bldg., Oakland, Cal.....	April	7, 1915
BURROWES, PAUL DE NYSE. Constr. Engr., Weld Mfg. Co., P. O. Box 415, Chatham, Mass.....	June	3, 1915

ASSOCIATE MEMBERS ( <i>Continued</i> )		Date of Membership.	
CANFIELD, GEORGE HOWARD. Care, U. S. Forest Service, Ketchikan, Alaska.....		June	3, 1915
CHRISTENSEN, GEORGE ANDREW. Civ. Engr., Quartermaster Corps, U. S. A., 116 Alpine Terrace, San Francisco, Cal. ....		June	3, 1915
CONARD, WILLIAM ROBERTS. Cons. and Insp. } Assoc.		Jan.	3, 1906
Engr., 322 High St., Burlington, N. J. . . . .		July	7, 1915
CRAM, WILLIAM CAREY, JR. Raleigh, N. C. ....		Mar.	2, 1915
CROW, HERMAN G. 86 Park Pl., Newark, N. J. ....		June	3, 1915
CUMMIN, HART. Engr., Morgan Eng. Co. } Jun.		April	2, 1912
(Res., 902 Summers St.), Dayton, Ohio. } Assoc. M.		June	3, 1915
EDGERTON, GLEN EDGAR. Capt., Corps of } Jun.		Nov.	8, 1909
Engrs., U. S. A., Care, Alaska Road } Assoc. M.		June	3, 1915
Comm., Valdez, Alaska. ....			
EKMAN, CLAES THEODORE. Civ. Engr. and } Jun.		Jan.	2, 1912
Arch., U. S. Govt., U. S. Engr. Office, } Assoc. M.		June	3, 1915
Sault Ste. Marie, Mich. ....			
ENSEY, JOHN HANSON. Asst. Engr. "A", Baltimore Sewerage Comm., 1600 Madison Ave., Baltimore, Md. ....		June	3, 1915
FRAME, THOMAS CLARK. Asst. Engr., Pennsylvania State Highway Dept., Warren, Pa. ....		June	3, 1915
GREENE, JOSEPH JOHN. Engr. in Chg., Tramway Constr. Work, Public Works Dept., Sydney, New South Wales, Australia. ....		April	7, 1915
HAM, PHILIP WINTHROP. In Chg., Eng. Dept., Great Western Power Co., 14 Sansome St., San Francisco, Cal. . .		June	3, 1915
HARRIS, ARTHUR LINES. Engr. in Chg., Public Works, Monte Christi, Dominican Republic. ....		April	7, 1915
HUMPHREYS, CHARLES RAYMOND. 60 Trust Bldg., Wilmington, N. C. ....		June	3, 1915
JACKSON, HERBERT ALFRED. Dist. Engr., Commonwealth Lighthouse Service, 395 Collins St., Melbourne, Victoria, Australia. ....		Mar.	2, 1915
JONES, ROBERT WATERMAN. City Engr.; (Jones & Flagg), McMinnville, Ore. ....		April	7, 1915
LEE, HARRY GEORGE. Chf. Engr., Standard Bitulithic Co., 301 Glenwood Ave., East Orange, N. J. ....		June	3, 1915
MCCANDLISS, EDGAR SCOTT. Asst. Prof. of Civ. Eng., Univ. of Missouri, School of Mines and Metallurgy, Box 548, Rolla, Mo. ....		June	3, 1915
MENEFEE, FERDINAND NORTHROP. Asst. Prof. } Jun.		June	30, 1911
of Eng. Mechanics, Univ. of Michigan, } Assoc. M.		June	3, 1915
6 Geddes Heights, Ann Arbor, Mich. . . . .			
MORROW, DAVID CAMPSEY. Engr., Borough of Washington, Washington, Pa. ....		June	3, 1915

ASSOCIATE MEMBERS (*Continued*)Date of  
Membership.

MURPHY, LEE ORLE. Hydr. Engr., Reno Power, Light & Water Co. and The Truckee River Gen. Elec. Co., Reno, Nev.....		April 7, 1915
NORSWORTHY, LEONARD DRAKE. Asst. Prof., Civ. Eng., Columbia University, New York City.....		June 3, 1915
OKES, SIDNEY ROBERT. (Anson Constr. Co.), 2436 First Ave., South, Minneapolis, Minn.....		June 3, 1915
ONDERDONK, ARTHUR. Care, Eden Mining Co., Bluefields, Nicaragua.....		Jan. 6, 1915
PETT, CHARLES ERNEST. Squad Engr., Post & McCord, Inc., 101 Park Ave., New York City.....		June 3, 1915
PRICE, DONALD DOUGLAS. 1957 Washington St., Lincoln, Nebr.....	Jun. } Assoc. M. }	Sept. 6, 1910 Sept. 2, 1914
REITZ, HENRY GEORGE. Asst. Engr., Sewers and Drains, 407 City Hall, Cleveland, Ohio.....		June 3, 1915
ROBERTS, RICHARD FRANCIS. Engr., Guggenheim Exploration Co., 120 Broadway, New York City (Res., 138 Centre St., Nutley, N. J.).....	Jun. } Assoc. M. }	May 31, 1910 April 7, 1915
ROBERTS, VINCENT. Vice-Pres., Portable Band-Saw Mill, Inc., 236 East 87th St. (Res., 448 Central Park West), New York City.....	Jun. } Assoc. M. }	Mar. 6, 1906 Dec. 2, 1914
ROBERTSON, STANLEY HORTON. Efficiency Engr., Winchester Repeating Arms Co., 226 Bishop St., New Haven, Conn.....		June 3, 1915
ROBINSON, FRANK HURD. Supt., Board of Public Works; City Engr., Hornell, N. Y.....		June 3, 1915
ROGERS, THOMAS FARWELL. Asst. City Engr., 707 North 1st St., San José, Cal.....	Jun. } Assoc. M. }	Mar. 5, 1907 June 3, 1915
SEARS, HORACE HOLMES. City Engr. and Cons. Engr., 7 Drew Bldg., Redwood City, Cal.....		June 3, 1915
SHAW, CLARK HERVEY. Hydr. Engr., Long Beach Water Dept., Room 6, City Hall Annex, Long Beach, Cal...		June 3, 1915
SITES, FREDERICK ROBERT. Contr. Engr., U. S. Steel Products Co., 24 <sup>th</sup> Kiangse Rd., Shanghai, China.....		Mar. 2, 1915
STROHL, RICHARDS MERLE. With The Berthe Co., Jonesboro, Ark.....	Jun. } Assoc. M. }	May 31, 1910 June 3, 1915
WALKER, LEE HAMILL. Div. Engr., Highway Constr. for Dominican Republic, Santo Domingo, Dominican Republic.....		June 3, 1915
WARREN, WILLIS DOW PECK. Cons. Engr. (Warren Eng. Co.), Powers Bldg., Decatur, Ill.....		April 7, 1915
WHITEAKER, ROBERT ORLANDO. (Whiteaker & Washington), 240 Moore Bldg., San Antonio, Tex.....		Dec. 2, 1914

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership.
WOLFF, REINHOLD BERTRAM. Asst. Engr., I. R. T. Co., Cooper, cor. Ridgewood Ave., Glendale, N. Y.....	June 3, 1915
YATES, SHELDON SMITH. Cons. Engr., 120 Broadway, New York City.....	June 3, 1915
ZEITFUCHS, EMIL ALBERT. Clerk of Works on Auditorium Bldg., 4657 Park Boulevard, Oakland, Cal.....	June 3, 1915

## ASSOCIATES

ELDRIDGE, CHARLES GUY. City Chemist and Supt. of Filtra- tion, 920 Fournier St., Fort Worth, Tex.....	June 3, 1915
MILLER, SAMUEL FISCHER. Pres., Pacific Flush-Tank Co., Singer Bldg., New York City (Res., South Orange, N. J.).....	June 3, 1915

## JUNIORS

BRESSANE, DARIO. Campanha, Minas, Brazil.....	Mar. 2, 1915
BUZZELL, RALPH WALDO. Camden, Me.....	June 3, 1915
CHASE, DEAN. 2849 Russell Ave., St. Louis, Mo.....	June 3, 1915
COLLINS, GEORGE MILES. Asst. Engr., City of Honolulu, 819 Kinau St., Honolulu, Hawaii.....	June 3, 1915
CONNOLLY, THOMAS ERNEST. Res. Engr., Hetch Hetchy Project, Ukiah, Cal.....	June 3, 1915
CORLETT, WILLIAM GREENFIELD. Oakland Bank of Savings Bldg., Oakland, Cal.....	Dec. 2, 1914
FINDLAY, ELWIN HAROLD. 175 West 73d St., New York City.	April 7, 1915
FITZGERALD, GERALD CHAPMAN. Prin. Asst. Engr., F. G. Dessery, 511 Central Bldg., Los Angeles, Cal.....	June 3, 1915
FULEIHAN, NASRI SOLOMON. Nicosia, Cyprus.....	Dec. 2, 1914
GALLAGHER, LEONARD BRUCE. 207 Noble St., Norristown, Pa.....	Dec. 2, 1914
GAULT, JOHN JAMES. Asst. Highway Engr., Bell County, Middlesboro, Ky.....	Mar. 2, 1915
HALLBERG, ARTHUR SIDNEY. Aid, U. S. Coast and Geodetic Survey, Manila, Philippine Islands.....	April 7, 1915
KELLEY, GEORGE NORBERT. Recorder, Interstate Commerce Comm., 119 North McGregor St., Carthage, Mo.....	June 3, 1915
KIPP, FREDERICK MARTIN, JR. Y. M. C. A., Newport News, Va.....	Jan. 6, 1915
LE GRAND, JOSEPH MASTELLA. Care, Eng. Dept., United Verde Copper Co., Clarkdale, Ariz.....	Mar. 2, 1915
MONTGOMERY, ALBERTIS. 3416 Lyndale Ave., S., Minne- apolis, Minn.....	Jan. 6, 1915
SUEN, SILVANUS THOMAS. Care, T. T. Lin, 17 Elgin Rd., Shanghai, China.....	June 3, 1915



JUNIORS (*Continued*)

	Date of Membership.
TODD, CARLOS NICOLAS. 15 No. 225, Vedado, Havana, Cuba.	April 7, 1915
WHITNEY, RALPH EDWARD. Res. Engr. for Robert Spurr Weston, 17 Breed St., Lynn, Mass.....	April 7, 1915

## CHANGES OF ADDRESS

## MEMBERS

- ALDERSON, ALGERNON BROWN. Town Engr., West Hartford, Conn.
- ALLAIRE, ALEXANDER. Western Mgr., The Foundation Co., Ltd., 860 Rookery Bldg., Chicago, Ill.
- ANTHONY, CHARLES. Gen. Mgr., Bahia Blanca Water-Works Co., Casilla de Correo 149, Bahia Blanca, Argentine Republic.
- ATWOOD, THOMAS CLARK. Superv. Engr., Yale Committee of Twenty-One, Inc.; Cons. Engr., 185 Church St., New Haven, Conn.
- BAKER, HOLLAND WILLIAMS. U. S. Asst. Engr., Green Bay, Wis.
- BALDWIN, ERNEST HOWARD. Asst. Chf. of Constr., U. S. Reclamation Service, 408 Tramway Bldg., Denver, Colo.
- BARR, JOHN TONER. Contr. Engr., 434 Diamond St., Pittsburgh, Pa.
- BEARDSLEY, JAMES WALLACE. 1406 Fidelity Bldg., Baltimore, Md.
- BELCHER, WALLACE EDWARD. 26 Allerton St., Plymouth, Mass.
- BELL, ALONZO CLARENCE. Care, Ford, Bacon & Davis, 921 Canal St., New Orleans, La.
- BELL, GILBERT JAMES. Engr., Western Dist., Eastern Lines, The A., T. & S. F. Ry., Newton, Kans.
- BELLINGER, LYLE FREDERICK. Civ. Engr., U. S. N.; Public Works Officer, U. S. Naval Station, Cavite, Philippine Islands.
- BENSEL, JOHN ANDERSON. Cons. Engr., 111 Broadway, New York City.
- BOOTH, GEORGE WILLIAM. Chf. Engr., Committee on Fire Prevention, National Board of Fire Underwriters, 76 William St., New York City.
- BOYDEN, HARRY CHESTER. Res. Engr., California Highway Comm., Sisson, Cal.
- BOYNTON, GEORGE HERBERT. German-American Savings Bank Bldg., Muscatine, Iowa.
- BREWSTER, HENRY BAUM. Engr., H. S. Kerbaugh, Inc., Contrs., 6 Church St., New York City.
- BRODIE, ORRIN LAWRENCE. Associate Efficiency Engr., Commrs. of Accounts, Room 2500, Municipal Bldg., New York City.
- BROWNING, GEORGE ELLIOT. Chf. Engr., Cochin Govt., Trichur, South India.
- BRYANT, BYRON HARKNESS. 56 West 68th St., New York City.
- BYERS, ALEXANDER MOSBY CLAYTON. 1424 Polk St., San Francisco, Cal.
- BYERS, CHARLES HOPKINS. Asst. Dist. Engr., Interstate Commerce Comm., Wells Fargo Bldg., San Francisco, Cal.
- CANTINE, EDWARD IKE. Engr. and Contr., 525 Northeast 49th St., Portland, Ore.

MEMBERS (*Continued*)

- CARLSON, CARL ALEXIUS. Civ. Engr., U. S. N., Navy Yard, Portsmouth, N. H.
- CARR, WALTER FRANK. Cons. Engr. and Mfrs. Agt., 950 Henry Bldg., Seattle, Wash.
- CHILDS, OLIVER W. Senior Highway Engr., U. S. Office of Public Roads, Dept. of Agriculture, Washington, D. C.
- COLE, EDWARD SMITH. Hydr. Engr.; Pres. and Mgr., The Pitometer Co., 25 Elm St., New York City.
- CONZELMAN, JOHN EDWARD. Vice-Pres. and Chf. Engr., Unit Constr. Co. of St. Louis, 701 International Life Bldg., St. Louis, Mo.
- COOPER, DAVID REGINALD. Hydr. Engr., 39 Cortlandt St., Room 811, New York City.
- CRUMP, RALPH LEE. Care, Galveston Wharf Co., Pier 41, Galveston, Tex.
- CUNNINGHAM, ANDREW CHASE. Civ. Engr., U. S. N.; Officer in Chg. of Constr., U. S. Naval Radio Station, Point Isabel, Tex.
- DEAN, BERTRAM DODD. Cons. Engr., 2110 L. C. Smith Bldg., Seattle, Wash.
- DRURY, EDMUND HAZEN. Cons. Engr., Dept. of Militia and Defence, Ottawa, Ont., Canada.
- DURHAM, HENRY WELLES. Cons. Highway and Municipal Engr., 366 Fifth Ave., New York City.
- ECKLES, HARRY EDWARD. Zion City, Ill.
- EHLE, BOYD. 48 Radford St., Yonkers, N. Y.
- ELLERY, NATHANIEL. Cons. Engr. (Ellery & Martin), 511 Merchants National Bank Bldg., San Francisco, Cal.
- ELLIS, GEORGE EZRA. Senior Signal Engr., Div. of Safety, Interstate Commerce Comm., Washington, D. C.
- ERNST, OSWALD HERBERT. Brig.-Gen., U. S. A. (*Retired*); Chairman, Am. Section, International Waterways Comm., Buena Vista Springs, Pa.
- EVANS, EDWIN GEORGE. Mgr., Moncton & Buctouche Ry., Moncton, N. B., Canada.
- EVERHAM, ARTHUR CASSIDY. Chf. Executive Officer, Board of Park Commrs., City Hall, Kansas City, Mo.
- FARLEY, PHILIP PATRICK. 103 Park Ave., New York City.
- FEILD, HUBBARD MOYLAN. Contr. Engr., 1404 Whitney Central Bldg., New Orleans, La.
- FICKES, CLARK ROBINSON. Res. Engr., Paducah & Ill. R. R., Metropolis, Ill.
- FIELDS, SAMUEL JAMES. 94 Plymouth Ave., Buffalo, N. Y.
- FINLEY, EDWIN CLIFFORD. 707 Dominion Bank Bldg., Toronto, Ont., Canada.
- FISHER, HOWELL TRACY. P. O. Box 411, Englewood, N. J.
- FISHER, SAMUEL BROWNLEE. Chairman, Valuation Committee, M., K. & T. Ry., Parsons, Kans.
- FLEMING, HARVEY BROWN. Vice-Pres. and Chf. Engr., Chicago City Ry., 105 South La Salle St., Room 810, Chicago, Ill.
- FRASER, CHARLES EDWARD. (Fraser, Brace & Co.), Power Bldg., Montreal, Que., Canada.

MEMBERS (*Continued*)

- FRENCH, FRANK CHAUNCEY. Sugar Station, Salt Lake City, Utah.
- GRANT, WILLIAM. (Grant & Fulton), 505 Bankers Life Bldg., Lincoln, Nebr.
- HAINES, HENRY STEVENS. Gwysaney, Lenox, Mass.
- HAMMER, JOHANNES MARCELIUS. Care, H. Oewre, Erling Skakkes Gate 15, Trondhjem, Norway.
- HAND, FRANKLIN CLARK. Care, Interstate Commerce Comm., Party No. 7, Cedar Rapids, Iowa.
- HATCH, JAMES NOBLE. Cons. Engr., 1340 Old Colony Bldg., Chicago, Ill.
- HAZLEHURST, GEORGE BLAGDEN. Catonsville, Md.
- HENDERSON, JOHN BAILLIE. Monkira, Hawthorne, Bulimba, near Brisbane, Queensland, Australia.
- HERINGTON, GEORGE B. With S. P. Co.; Res., 200 East Bay State Ave., Alhambra, Cal.
- HODGDON, FRANK WELLINGTON. 18 Wellington St., Arlington, Mass.
- HOGUE, CHESTER JAMES. Archt. and Engr. (Foulkes & Hogue), Commercial Club Bldg., Portland, Ore.
- HORROCKS, JOHN IRVIN. 309 Crary Bldg., Seattle, Wash.
- HOWARD, FREDERICK BILLINGS. Chf. Engr., Grosse Ile Bridge Co., R. F. D. Box 103, Grosse Ile, Mich.
- HOWE, WILSON TYLER. Care, City Engr., Salem, Mass.
- HOXIE, RICHARD LEVERIDGE. Brig.-Gen., U. S. A. (*Retired*), Iowa City, Iowa.
- HUNT, ANDREW MURRAY. Cons. Engr., 55 Liberty St., New York City.
- IDE, WILLIAM STONE. Slater Mills, Webster, Mass.
- JACOBS, JOSEPH. Cons. Engr., 730 Central Bldg., Seattle, Wash.
- JORDAN, RICARDO TOMAS. Member, Comision Tecnica del Petroleo, Calle de Altamira, num. 221, Tampico, Tam., Mexico.
- JORGENSEN, LARS RASMUS. Elec. and Hydr. Engr., 1405 Chronicle Bldg., San Francisco, Cal.
- KLINCK, JOHN HENRY. Mgr., Industrial and Power Div., Westinghouse Elec. & Mfg. Co., Brown and Marx Bldg., Birmingham, Ala.
- KNIGHTON, JOHN ALBERT. Engr. in Chg. of Harlem River Div., Dept. of Bridges, City of New York, 2221 Madison Ave., New York City.
- LA CHICOTTE, HENRY ARTHUR. 203 Underhill Ave., Brooklyn, N. Y.
- LAKE, EDWARD NELSON. 321 Center St., Wheaton, Ill.
- LAYFIELD, ELWOOD NORMAN. 1735 Monadnock Blk., Chicago, Ill.
- LEAVENWORTH, GEORGE STEVENS. Cons. Engr., 2320 Central Ave., Augusta, Ga.
- LEBARON, JOHN FRANCIS. Economic Geologist, R. F. D. 1—Box 118, Essex, Mass.
- LEWINSON, MAXYMILIAN. 7 East 42d St., New York City.
- LEWIS, EVERETT WILSON. 234 Union St., New Bedford, Mass.
- MACDONALD, CHARLES. Blinkbonny, Gananoque, Ont., Canada.
- MCDONOUGH, JAMES ALBERT. U. S. Asst. Engr., U. S. Engr. Office, P. O. Box 716, Cincinnati, Ohio.
- MCKINSTRY, CHARLES HEDGES. Lt.-Col., Corps of Engrs., U. S. A., 39 Whitehall St., New York City.

MEMBERS (*Continued*)

- McMEEKIN, CHARLES WILLIAMS. Surface Supt., Goldfield Consolidated Mines Co., 1226 Forty-Seventh Ave., San Francisco, Cal.
- MALTY, FRANK BIERCE. 611 Chestnut St., Philadelphia, Pa.
- MARTIN, JOHN. Efficiency Engr., 220 Broadway, New York City.
- MATHEWSON, THOMAS KNIGHT. Care, E. B. Spriggs, Agt., Ferrocarril de Sonora, Nogales, Ariz.
- MATTHES, GERARD HENDRIK. Care, Morgan Eng. Co., City National Bank Bldg., Dayton, Ohio.
- MEARS, FREDERICK. Member, Alaskan Eng. Comm., U. S. Dept. of the Interior, Anchorage, Alaska.
- MILLER, HARVEY COOPER. Cons. and Contr. Engr., 47 West St., New York City.
- MOORE, WILLIAM SMELSON. City Engr., City Hall, Grand Rapids, Mich.
- MORROW, JAY JOHNSON. Lt.-Col., Corps of Engrs., U. S. A., Balboa Heights, Canal Zone, Panama.
- MORSE, CHARLES FRANCIS. Asst. Engr., New York State Dept. of Highways, Hotel Pontiac, Good Ground, N. Y.
- MURALT, CARL LEONARD DE. Care, Maffei-Schwartzkopff, 23 Chaussée Strasse, Berlin N-4, Germany.
- NELSON, ARCHY MAGILL. Asst. Engr., Ore. Short Line R. R. and S. P. Co., 6 Cummings Apartment, 1st Ave. and D St., Salt Lake City, Utah.
- NEWELL, FREDERICK HAYNES. Cons. Engr., U. S. Reclamation Service; Prof. of Civ. Eng., Univ. of Illinois, 1109 California St., Urbana, Ill.
- NEWTON, ALBERT WILLIAM. Asst. to Pres., C. B. & Q. R. R., Chicago, Ill.
- OTAGAWA, MASAYUKI. 57 Haramachi Ichhome, Ushigomeku, Tokyo, Japan.
- PATTISON, HUGH. 1610 Spruce St., Philadelphia, Pa.
- PEABODY, WILLIAM WELCOME. 30 Grove St., Middletown, N. Y.
- PHILLIPS, HOWARD CRATHMORE. 937 Commercial Trust Bldg., Philadelphia, Pa.
- POLK, ARMOUR CANTRELL. Res. Engr. and Supt. of Constr., Sanderson & Porter, P. O. Box 86, Parkersburg, W. Va.
- POPE, CHARLES STOCKTON. Engr. of Paving, City of Los Angeles, Office of City Engr., Los Angeles, Cal.
- POTTER, CHARLES LEWIS. Lt.-Col., Corps of Engrs., U. S. A., U. S. Engr. Office, 321 Custom House, Portland, Ore.
- PULLIGNY, JEAN LECLERC DE. 4 Cité Vaneau, Paris, France.
- RABELLO, CESAR DE SA. Technical Director, Companhia Brasileira de Energia Electrica, Rua Cosme Velho 185, Rio de Janeiro, Brazil.
- RASTER, WALTHER. Office Mgr., E. C. & R. M. Shankland, 6743 Greenview Ave., Chicago, Ill.
- REABURN, DE WITT LEE. Superv., Mt. Ranier National Park, Ashford, Wash.
- REED, MELVILLE EMERSON. Cons. Engr., 802 Lewis Bldg., Portland, Ore.
- REEDY, OLIVER THOMAS. Constr. Engr., U. S. Reclamation Service, Fort Laramie, Wyo.
- RICKER, GEORGE ALFRED. Cons. Engr., 110 State St., Albany, N. Y.

MEMBERS (*Continued*)

- RIGHTER, ADDISON ALEXANDER. Cons. Engr., 1531 First National Bank Bldg., Chicago, Ill.
- ROCKWELL, JAMES VINCENT. Civ. Engr., U. S. N., Navy Yard, Pensacola, Fla.
- RUSSELL, RICHARD LORD. Chf. Engr., Eastern Contr. Co., 375 Fulton St., Brooklyn, N. Y.
- SAUNDERS, WALTER BOWEN. Care, Great Falls Power Co., Great Falls, Mont.
- SELLEW, FRANCIS LIBBY. Box 522, La Jolla, Cal.
- SHATTUCK, ORVILLE FRANK. Cons. Engr., 735 West Drive, Woodruff Pl., Indianapolis, Ind.
- SHERMAN, LE ROY KEMPTON. Commr., Illinois Rivers and Lakes Comm., 905 State Bldg., Chicago, Ill.
- SHERMAN, RICHARD WILLETTE. Cons. Engr., 104 South Lake Ave., Albany, N. Y.
- SHIPMAN, EUGENE HICKS. Supt., L. & N. E. R. R., Canal; Supt., Lehigh Coal & Nav. Co., South Bethlehem (Res., 15 South 8th Ave., Bethlehem), Pa.
- SMITH, CHARLES EDWARD. Cons. Engr., 2075 Ry. Exchange Bldg., St. Louis, Mo.
- STERN, ISAAC FARBER. Cons. Engr., 1340 Old Colony Bldg., Chicago, Ill.
- STICKLE, HORTON WHITEFIELD. Maj., Corps of Engrs., U. S. A., 309 Custom House, Baltimore, Md.
- STICKNEY, GEORGE FETTER. 207 Arkay Bldg., Albany, N. Y.
- STOCKETT, ALFRED WALTON. Mauch Chunk, Pa.
- SUNDSTROM, ALFRED YNGVE. Care, Byington & Co., Rua do Comercio No. 4, São Paulo, Brazil.
- SUTTON, CHARLES WOOD. 10 Franklin Ave., Yonkers, N. Y.
- THOMSON, REGINALD HEBER. 520 Alaska Bldg., Seattle, Wash.
- TITTMANN, OTTO HILGARD. Leesburg, Va.
- TODD, FRANK HERBERT. Cons. Engr. for the City of El Paso, 1019 Mundy Ave., El Paso, Tex.
- TROUT, HARRY EDGAR. Box 193, Sayre, Pa.
- TUTHILL, JOB. 86 Park Pl., Newark, N. J.
- UHLER, WILLIAM DAVID. Chf. Engr., Pennsylvania State Highway Dept., Harrisburg, Pa.
- VAN PELT, SUTTON. Cons. Engr., First National Bank Bldg., La Porte, Ind.
- VENABLE, WILLIAM MAYO. Engr., Blaw Steel Constr. Co., 5507 Hornhurst St., Pittsburgh, Pa.
- WALTER, RAYMOND F. Care, U. S. Reclamation Service, El Paso, Tex.
- WARE, JOHN. Asst. Treas., Portneuf-Marsh Val. Irrig. Co., East Milton, Mass.
- WATSON, IRVINE. State Engr.'s Office, Salem, Ore.
- WEAKLAND, FRANCIS LEE. Meyersdale, Pa.
- WEEDIN, KIRBY CALHOUN. Const. Supt., The J. G. White Eng. Corporation, Galatea, Colo.

MEMBERS (*Continued*)

- WELLS, GEORGE HENRY. Archt., 10 East 43d St., New York City.  
WHITNEY, HERBERT ANGELL. Care, Whitney Eng. Co., Tacoma, Wash.  
WILLIAMS, CHARLES PAGE. Care, U. S. Reclamation Service, Fort Shaw, Mont.  
WILLIAMSON, SYDNEY BACON. Chf. of Constr., U. S. Reclamation Service, Denver, Colo.  
WILSON, FREDERICK CHARLES. Prof. of Civ. and San. Eng., Clarkson Coll. of Technology, Potsdam, N. Y.  
WILSON, HERBERT MICHAEL. The Associated Cos., 2407 First National Bank Bldg., Pittsburgh, Pa.  
WOLFF, HANS HERMAN. 40 Renwick St., New York City.  
WORTHINGTON, CHARLES. 308 West 97th St., New York City.  
WRIGHT, JOSEPH BODINE. 136 West 80th St., New York City.  
YORK, HERBERT WALDO. Cons. Engr., Am. Smelting & Refining Co., 120 Broadway, New York City (Res., 121 Bay 26th St., Brooklyn, N. Y.).

## ASSOCIATE MEMBERS

- AGNEW, AUGUSTUS WATEROUS. Care, William Agnew, 1322 Rossland Ave., Victoria, B. C., Canada.  
ALBERT, DANIEL WESLEY. Supt., South Yuba Min. & Development Co., Yuba City, Cal.  
AMADON, FREDERICK WEBBER. Computer, Interstate Commerce Comm., Div. of Valuation, 1425 Chapin St., Washington, D. C.  
ANCONA, JOHN FLINN. Engr., Design and Constr., Eastman Kodak Co., Kodak Park, Rochester, N. Y.  
ASHBROOK, CHESTER DANIEL. Care, The Braden Copper Co., Rancagua, Chili.  
BAKER, GEORGE EVERETT. Cons. Engr., Whitehall, Mont.  
BALL, EDGAR E. Div. Engr., A., T. & S. F. Ry., Fresno, Cal.  
BARDURY, JUAN BATISTE HIPOLYTE. Const. Engr., San Pedro de Macoris, Dominican Republic.  
BARNES, WALTER ESMOND. Woodlawn Ave., Wellesley Hills, Mass.  
BASSETT, ROBERT JAY. Care, A. Pasquini, 30 East 42d St., New York City.  
BEATY, ROBERT ERNEST. Care, The Brooklyn Engineers' Club, 117 Remsen St., Brooklyn, N. Y.  
BEE, CHARLES EVERETT. Santa Barbara, Cal.  
BELL, GEORGE EDWARD. 5 Mount Ave., Ealing, London, W., England.  
BENSON, HENRY CRIST. Asst. Engr., Filter Plant, William H. Dechant & Son, Salladasburg, Pa.  
BESWICK, JAMES EVERETT. 19 Fort Pl., New Brighton, N. Y.  
BILYEU, CHARLES SMITH. With Hildreth & Co., 15 Broad St., New York City.  
BLAAUW, GEERT. R. F. D. No. 4, New Brunswick, N. J.  
BOND, JUDSON BAKER. Project Engr., U. S. Reclamation Service, Browning, Mont.



ASSOCIATE MEMBERS (*Continued*)

- BOUGHTON, WILL HAZEN. 171 South Cherry St., Poughkeepsie, N. Y.  
BOWLES, CLAYTON WASS. Prop., Fairview Automobile Co., Fairview, Mont.  
BRADLEY, WILLIAM LITTELL. Div. Engr., A., T. & S. F. Ry., Box 307, Needles, Cal.  
BRADSHAW, CHARLES. Montrovia, Cal.  
BRIGGS, EALY GRANNIS. 1393 Cleveland Ave., St. Paul, Minn.  
BRIGHT, DUDLEY SEYMOUR. Box 24, Youngstown, Ohio.  
BUNDY, OSCAR HAROLD. Asst. Engr., So. Ry., 1818 Kilbourne Pl., N. W., Washington, D. C.  
BURGESS, EZRA OTTLEY. 1171 Colusa Ave., Berkeley, Cal.  
BURR, MYRON CARLOS. Civ., Hydr., and Min. Engr., Box 642, Martinez, Cal.  
BURTON, WILLIAM. 910 Dime Savings Bank Bldg., Detroit, Mich.  
CARR, DEAN ORRICE. With Fargo Eng. Co., P. O. Box 161, Jackson, Mich.  
CARTER, LESTER LEVI. 333 Burnside St., Portland, Ore.  
CHASE, WILLIAM HENRY. Asst. Engr., City of New Bedford (Res., 216 Middle St.), New Bedford, Mass.  
CHESLEY, FRANK EPHRAIM. Downingtown, Pa.  
CHRISTIANSEN, EUGENE OLAF. Engr. to Tax Committee, Assessor's Office, Cambridge, Mass.  
CLINTON, SAMUEL DEXTER. Asst. Field Engr., Interstate Commerce Comm., Wells Fargo Bldg., San Francisco, Cal.  
CLYDE, RAY WEDGEWOOD. Osage, Iowa.  
COLLINS, FRANK JOSEPH. Pres., Dale Eng. Co., Mann Bldg., Utica (Res., 3 Beverly St., Rochester), N. Y.  
COMSTOCK, ARTHUR FRANCIS. 17 Alsace Ave., Buffalo, N. Y.  
COOPER, SYDNEY WOODDELL. Harrisville, W. Va.  
COVEY, CHARLES HENRY. Asst. Supt., Fraser Brace & Co., Cambridge, Vt.  
CRANE, ERNEST BUCHANAN. Asst. Engr., C., M. & St. P. Ry., Mobridge, S. Dak.  
CRAVEN, JAY ALLEN. Care, U. S. Public Health Service, Marine Hospital Bldg., Cincinnati, Ohio.  
DANN, ALEXANDER WILLIAM. Treas. and Supt., Dravo Contr. Co., 5599 Baum Boulevard, Pittsburgh, Pa.  
DAVIS, EDSON JOSEPH. Box 1160, Sacramento, Cal.  
DAVIS, GILBERT LOUIS. Asst. Engr., U. S. Reclamation Service, Saco, Mont.  
DECKER, FRANK WARWICK. Care, Mrs. Homer Decker, La Porte, Ind.  
DEUTSCHBEIN, HARRY JOHNSON. 1434 East 18th St., Brooklyn, N. Y.  
DEVLIN, HENRY STRATFORD. 40 Baldwin Ave., Newark, N. J.  
DILKS, LORENZO CARLISLE. Pres., Milliken Bros., Inc., 17 Battery Pl., New York City.  
DORISS, HOWARD. Gen. Mgr., Cement Products Co. of Canada, Ltd., 104 Mountain Hill, Quebec, Que., Canada.  
DRAYTON, NEWBOLD. With E. S. du Pont de Nemours Powder Co., Care, Riverside Club, Penns Grove, N. J.  
EAGER, VERNON MILTON. Civ. and Drainage Engr., Cathlamet, Wash.

ASSOCIATE MEMBERS (*Continued*)

- EDELEN, THOMAS JEFFERSON STONE. Care, Edelen-Kilvert Co., 304 Tribune Bldg., Winnipeg, Man., Canada.
- ELLIS, GWYNNE WALLACE. Pratt, Kans.
- FAIN, JAMES RHEA. Supt. of Constr. of Public Bldgs., Jellico, Tenn.
- FALTER, PHILIP HENRY. Gen. Mgr., The Shawinigan Electro Products Co., U. S. Fidelity & Guarantee Bldg., Baltimore, Md.
- FARNHAM, CHARLES HENRY. Vice-Pres., William M. Bailey Co., 88 Broad St., Boston, Mass.
- FIRTH, JOSEPH. 12 $\frac{1}{2}$  South Tryon St., Charlotte, N. C.
- FOGG, PERCIVAL MORRIS. Project Mgr., U. S. Reclamation Service, Carlsbad, N. Mex.
- FORD, ROBERT HENRY PERSSE. Engr., Track Elev., Rock Island Lines, La Salle St. Station (Res., 9041 Hoyne Ave., Beverly Hills), Chicago, Ill.
- FOUNTAIN, THOMAS LILLY. Engr. of Sewers, Dallas, Tex.
- FRASQUIERI Y REGUEIFERO, TRANQUILINO. Chf., Bureau of Forestal Service, Dept. of Agriculture, Concordia 161-B, Havana, Cuba.
- FRENCH, CARSON GEYER. Cons. Structural Engr., 508 Union Bldg., Cleveland, Ohio.
- FULLER, CARL HAMILTON. Care, Memphis Steel Constr. Co., Greensburg, Pa.
- GANNETT, FARLEY. Cons. Engr., Telegraph Bldg., Harrisburg, Pa.
- GIESTING, FRANK ALEXANDER. Cons. Engr., 317 West 99th St., New York City.
- GLANDER, JOHN HENRY, JR. Care, Charles W. Leavitt, 220 Broadway, New York City.
- GORHAM, FRED ALLEN. Asst. Engr., U. S. Reclamation Service, Powell, Wyo.
- GORTON, WILLARD LIVERMORE. Care, Idaho Irrig. Co., Richfield, Idaho.
- GRAY, EDWARD. 1706 Barton Ave., Richmond, Va.
- HAAS, PHILIP LIPPMAN. Asst. Engr., New York State Highway Comm., 288 Mansion St., Poughkeepsie, N. Y.
- HARDONCOURT, ARTHUR, JR. Cons. Engr., Fiske & Co., Inc., 40 West 32d St., New York City.
- HARVEY, CLARKE KENNERLEY. Asst. Engr. to Harry J. Lewis, 101 Labelle St., Pittsburgh, Pa.
- HAYES, ANDREW JENKINS. 355 Central Ave., New Haven, Conn.
- HAYES, FERDINAND EUGENE, JR. Care, Ballard & Ballard Co., Louisville, Ky.
- HAYS, DONALD SYMINGTON. 215 Central Bldg., Portland, Ore.
- HAZARD, WILLIAM ABBOTT. Care, Lackawanna Bridge Co., Buffalo, N. Y.
- HENRY, DAVID EDWARD. Senior Superv., Dept. of Public Works, Manila, Philippine Islands.
- HEWES, FLOYD SINNOCK. Office Engr., Oil Fields and S. F. Ry., P. O. Box 248, Cushing, Okla.
- HOGAN, JOSEPH VINCENT. 78 Gibson St., Canandaigua, N. Y.
- HOLMES, FRANK. 15 Forbes Terrace, Pittsburgh, Pa.

ASSOCIATE MEMBERS (*Continued*)

- HOLMES, HOWARD WHITTIER. Chf., Bureau of Highways and Bridges, Dept. of Public Works, 1063 Marion St., Salem, Ore.
- HOUSTON, JOHN JAY LAFAYETTE. 212 West Second St., Oswego, N. Y.
- HOWSON, GEORGE WILLIAM. Civ. and Hydr. Engr., Sierra & San Francisco Power Co., Confidence Post Office, Cal.
- HUESTIS, CHARLES CALVIN. 512 South Jackson St., Greencastle, Ind.
- HUTCHINGS, JOHN BACON, JR. Architectural Engr., John B. Hutchings & Sons, 768 Barret Ave., Louisville, Ky.
- IMMEDIATO, GERARDO. Care, Public Service Comm., First Dist., 154 Nassau St., New York City.
- JACKSON, STUART WILSON. Div. Engr., Dist. No. 13, Pennsylvania State Highway Dept., in Chg. of Constr. and Maintenance, 904 Hartje Bldg., Pittsburgh, Pa.
- JOHNSON, NATT MADISON. Northfield, Vt.
- JONES, WALTER ALPHEUS. 69 Audubon St., New Haven, Conn.
- KASSEBAUM, FREDERICK WILLIAM, JR. 816 First National Bank Bldg., Chicago, Ill.
- KAYSER, EDWARD MATHEW. Engr. and Supt., Mason, Hilton & Co., 100 Fifth Ave., Paterson, N. J.
- KEENE, WILLIAM ARCHIBALD, JR. Supt., Mid-West Constr. Co., 1019 Grand Ave., Kansas City, Mo.
- KEITH, CHARLES WHITESIDE. 209 Willow St., Hannibal, Mo.
- KELLER, ARTHUR RIPONT. 15 Allen St., Buffalo, N. Y.
- KERR, STANLEY ALBERT. Asst. Engr., U. S. Reclamation Service, Fort Shaw, Mont.
- KESNER, HENRY JAMES. Salida, Colo.
- KINGMAN, EDWARD DYER. 55 Lincoln St., Framingham, Mass.
- KINGSLEY, EDGAR ALBERT. Cons. Engr., City Hall, San Antonio, Tex.
- KIRKPATRICK, HARLOW BARTON. Sales Engr., H. Koppers Co., 1006 First National Bank Bldg., Pittsburgh, Pa.
- KLEIN, ALBERT ROBERT. Care, Bosch Magneto Co., Springfield, Mass.
- KNIGHT, GERALD WILSON. Cons. Engr. (Knight & Quayle), 408 Times Bldg., Chattanooga, Tenn.
- KNISKERN, LEWIS THAYER. (Knap & Kniskern), Marquette Bldg. (Res., 4458 Drexel Boulevard), Chicago, Ill.
- LAWRENCE, CHARLES WALTER. Prof., Civ. Eng., Univ. of Southern California, 659 North Alexandria Ave., Los Angeles, Cal.
- LEACH, THOMAS. Care, Ferguson Steel & Iron Co., Bailey Ave., South of Broadway, Buffalo, N. Y.
- LEARNED, CLYDE EMERSON. Care, Mrs. Spears, R. F. D. No. 1, Massena, N. Y.
- LEE, ERNEST EUGENE. 10511 South Hamilton Ave., Chicago, Ill.
- LINEBERGER, WALTER FRANKLIN. 513 West First St., Long Beach, Cal.
- LINTON, WALTER POWELL. Care, Interstate Commerce Comm., Div. of Valuation, Eastern Dist., Washington, D. C.

ASSOCIATE MEMBERS (*Continued*)

- McALLISTER, DANIEL HANDLEY. Supt., Utah Lake Irrig. Co., Lehi, Utah.
- McCANN, WILLIAM RAY. Care, State Public Utilities Comm., Capitol Bldg., Springfield, Ill.
- McDERMITH, ORO. Irrig. Mgr., U. S. Reclamation Service, El Paso, Tex.
- McDONALD, HARRY L. Asst. Topographer, U. S. Geological Survey, Box 247, Prosser, Wash.
- McGLATHERY, SAM LYON. Pass Christian, Miss.
- McKENZIE, ANDREW JACKSON. Vice-Pres. and Gen. Mgr., McKenzie Constr. Co., P. O. Box No. 58, San Antonio, Tex.
- McLEOD, DONALD FRASER. University, Miss.
- MALUKOFF, ALEXIS JOSEPH. 213 West 136th St., New York City.
- MARSH, CHARLES REED. Supt. of Constr., U. S. Public Bldgs., Treasury Dept., Brattleboro, Vt.
- MARTIN, CHARLES CHRISTOPHER. 1115 Nineteenth St., Parkersburg, W. Va.
- MARTIN, WILLIAM FRANKLIN. Asst. Prof., Eng. Mechanics, Univ. of California; Cons. Engr. (Ellery & Martin), 511 Merchants National Bank Bldg., San Francisco, Cal.
- MERRILL, ROBERT HALL. Asst. Engr., Barge Canal Office, 70 North Allen St., Albany, N. Y.
- MERRIMAN, FRED KNIGHTS. Spearfish, S. Dak.
- MEYER, GROVER JOHN. Elec. Engr., Montreal & Southern Counties Ry., St. Lambert, Que., Canada.
- MILLARD, WILLIAM JOHN. Box 158, Tulsa, Okla.
- MILLER, EDWARD THOMAS EVERY. Ingeniero Seccional, Estacion Rosario Norte, F. C. Central Argentino, Rosario, Sante Fé, Argentine Republic.
- MILLER, GEORGE SOTER. Pres., Northwestern Vacuum Churn Corporation, 827½ Nicollet Ave., Minneapolis, Minn.
- MINER, ERWIN JOHN. 2515 Garland Ave., Louisville, Ky.
- MOBBERLY, HENRY PEYTON. Div. Engr., Tex. & Pac. Ry., Marshall, Tex.
- MONETT, HARRY. Asst. Engr., Spring Val. Water Co., 2913 Regent St., Berkeley, Cal.
- MOORE, CHARLES REA. Asst. Engr., Ore.-Wash. R. R. & Nav. Co., 1208 Wells-Fargo Bldg., Portland, Ore.
- MOSLEY, EARL LOUIS. 2522 Vine St., Denver, Colo.
- MURPHY, EDWARD THEOBALD. U. S. Junior Engr., U. S. Engr. Office, Pigeon Cove, Mass.
- NICHOL, HENRY SCHELL. Somerset, Pa.
- NOLAND, CUTHBERT POWELL, JR. 1210 Brown Marx Bldg., Birmingham, Ala.
- NUNN, HERBERT. County Highway Engr., Multomah County, 733 Wasco St., Portland, Ore.
- O'HARA, JOSEPH MATTHEW. Cons. Engr., St. Ignatius, Missoula Co., Mont.
- PAINE, HIBBARD ATWILL. (Paine & DeWitt), 1007 Adams St., Wilmington, Del.
- PARRIGIN, FRANK SNOW. Lexington, Ky.

ASSOCIATE MEMBERS (*Continued*)

- PAYNE, JAMES ELWOOD. Pres. and Gen. Mgr., The J. E. Payne Co., Inc. (Res., 892 Neil Ave.), Columbus, Ohio.
- PELLISSIER, GEORGE EDWARD. Cons. Engr., 317 Main St., Springfield, Mass.
- PIERCE, PAUL LEON. Constr. Supt., Wisconsin River Power Co., Madison, Wis.
- PILLET, FREDERICK FISCHER. Cons. Engr., Title Insurance Bldg., Mobile, Ala.
- PINNER, GUY. 603 Frost Bldg., San Antonio, Tex.
- PORTER, RALPH WALDO. 563 Beverly Rd., Milwaukee, Wis.
- RANNELS, CLARENCE J. Rochester, Ind.
- REA, RICHARD WILLIS. Chf. Engr., Coast Culvert & Flume Co., Kenton Station (Res., 403 East 16th St., North), Portland, Ore.
- REEVES, CARL HOWELL. Asst. Engr., The Public Service Comm. of Washington, 4722 Latona Ave., Seattle, Wash.
- REICHARDT, WALTER FREDERICK. Cons. Engr., 307 South 4th St., Watertown, Wis.
- REMSEN, THOMAS RICHARD. Care, Laurentide Co., Ltd., Grand Mere, Que., Canada.
- RENSHAW, ROBERT HENRY, JR. Chf. Engr., Chesapeake Constr. Co., Centerville, Md.
- RHODES, CLAUDE IRVIN. Asst. Engr., California State R. R. Comm., 1536 Walnut St., Berkeley, Cal.
- RHODES, GLENN VERNON. 502 Eighth Ave., San Francisco, Cal.
- RICE, RAY HOWARD. Div. of Valuation, Interstate Commerce Comm., Washington, D. C.
- ROAKE, STEPHEN ALLEN. 1 Windsor Pl., Bloomfield, N. J.
- ROWLAND, WALTER. Asst. Engr., Panama Canal, Box 265, Balboa Heights, Canal Zone, Panama.
- SAMPSON, FRANK WATKINS. Care, Eng. Dept., I. & G. N. Ry., 603 Mason Bldg., Houston, Tex.
- SAWYER, HOWARD LEWDEN. With The Miami Copper Co., Box 100, Miami, Ariz.
- SCHARSCHMIDT, SAMUEL HOWARD. 234 Division St., Elkhart, Ind.
- SCHICK, HERMAN SCHOVE. Care, U. S. Engr. Office, Dam 17, Marietta, Ohio.
- SEXTON, RALPH ERNEST. Beardstown, Ill.
- SHAUGHNESSY, CHARLES STEPHEN. Eng. Examiner, Municipal Civil Service Comm., New York City, 178 Amity St., Flushing, N. Y.
- SHAW, WALTER FARNSBY. 222 Pierce St., Jamestown, N. Y.
- SMITH, JONATHAN RHODES. Care, Phoenix Bridge Co., Phoenixville, Pa.
- SMITH, LONDON GARLAND. Div. Engr., Mobile & Ohio R. R., Meridian, Miss.
- SMITH, SHALER GORDON. Care, Waukesha Gas & Elec. Co., Waukesha, Wis.
- SMITH, WILLIAM BEAUVAIS, JR. U. S. Junior Engr., Box 1330, New Orleans, La.
- SPEICHER, PIUS MELANTHON. Care, Hercules Powder Co., Kenil, N. J.
- STEPHENS, GEORGE HIPPLESLEY STANLEY. Asst. Engr., South African Rys., Care, Constr. Office, Ry. Constr., Upington, Cape Colony, South Africa.

ASSOCIATE MEMBERS (*Continued*)

- STEVENS, ROE LOOMIS. With Eng. Dept., C. M. & St. P. Ry., Ry. Exchange (Res., 649 East 46th St.), Chicago, Ill.
- STINEMAN, NORMAN MERRITT. Bridge Designer, Eng. Dept., C. M. & St. P. Ry., 4635 Kenmore Ave., Chicago, Ill.
- STONE, GEORGE BURRILL. Engr., The Utah Fertilizer & Chemical Co., 131 South Main St., Salt Lake City, Utah.
- STRAWN, THOMAS CORWIN. Phœnix, N. Y.
- STURT, GEORGE ELIOTT. Junior Engr., U. S. War Dept., 1009 South Saginaw St., Flint, Mich.
- TARR, CHARLES WINTHROP. Oakdale, Pa.
- TATUM, ROBERT LEE. Chf. of Party with Vermillion County Highway, Glasgow, Mo.
- THAYER, NATHANIEL AUGUSTINE. 414 West 120th St., New York City.
- TIRRELL, CHARLES EDWARDS. Chf. Engr., A. Friederich & Sons Co., 710 Lake Ave., Rochester, N. Y.
- TOOPS, GEORGE NOBLE. Prin. Asst. Engr., M. O. & G. Ry., Room 5, M. O. & G. Ry. Bldg., Muskogee, Okla.
- TORNQUIST, CHARLES HERMAN. Care, W. A. Kroner & Co., Ellensburg, Wash.
- TRAVELL, WARREN BERTRAM. Constr. Engr., Atlas Portland Cement Co., Northampton, Pa.
- TRAVERS-EWELL, ANDREW. Ambulance Americaine, Neuilly-sur-Seine, Paris, France.
- TROUT, ALEXANDER LINN. 307 Free Press Bldg., Detroit, Mich.
- TUFTS, WILLIAM. With Nashua Mfg. Co., 43 Stark St., Nashua, N. H.
- TURLEY, OMNER JAY. Cons. Engr., 1600 Arizona St., El Paso, Tex.
- TURNER, DOUGLAS BARLOW. 3953 Westminster Pl., St. Louis, Mo.
- TURNER, OMAR ASA. 401 Engineers Bldg., Cleveland, Ohio.
- UNDERHILL, GRANDISON GRIDLEY. Barge Canal Office, Albany, N. Y.
- VANDEMOER, NICHOLAS CORNEILIUS. Care, C. A. Robinson, San Acacio, Colo.
- VANDERVOORT, BENJAMIN FRANKLIN. 625 Lincoln Pl., Brooklyn, N. Y.
- VANDEVANTER, ELLIOTT. Superv. Engr., Claiborne Johnston & Co., P. O. Box 154, St. Catharines, Ont., Canada.
- VAN DUZER, WILLIAM ALBIE. Asst. Engr., State Highway Dept., York, Pa.
- VINTON, THOMAS MACINTIRE. Pres., Vinton, Trout & Wheeler, 41 Park Row, New York City.
- WALKER, EDWARD MANSFIELD. Grade Separation Engr., M. C. R. R., 532 Michigan Central Station, Detroit, Mich.
- WALTON, HARRY COLLINS. New England Representative, McClintic-Marshall Co., 68 Devonshire St., Boston, Mass.
- WARNOCK, WILLIAM HAROLD. Asst. Engr., Board of Water Supply, Florence Ave., Edgemere, N. Y.
- WEEKS, HARRY ARTHUR. Highway Engr., Westport, N. Y.
- WESTON, BENJAMIN THOMAS. Constr. Engr., H. S. Ferguson, Madison, Me.
- WILLIAMS, MAURICE. State Engr.'s Office, Albany, N. Y.



ASSOCIATE MEMBERS (*Continued*)

- YEN, TE CHING. Managing Director, Canton-Hankow Ry., Wuchang, Care,  
Post Office, Hankow, China.  
ZORN, GEORGE WASHINGTON. Hydr. and Gen. Eng., Greybull, Wyo.

ASSOCIATES

- BELZNER, THEODORE. Insp. of Steel, Div. of Maintenance, Queensboro Bridge,  
Dept. of Bridges, 305 East 60th St. (Res., 606 West 135th St.), New  
York City.  
BROMLEY, ALBERT HENRY, JR. Care, Berger Mfg. Co., 211 Society for  
Savings Bldg., Cleveland, Ohio.  
POLK, WILLIAM ANDERSON. 9 Rue de la Pepiniere, Paris, France.  
RANSOME, ERNEST LESLIE. 916 Madison Ave., Plainfield, N. J.  
WRENN, JAMES FRANCIS. Vice-Pres. and Gen. Mgr., McGuire Constr. Co.,  
P. O. Box 256, New Bern, N. C.

JUNIORS

- ACKHART, ANDREW LEWIS. Box 67, Preston, Ont., Canada.  
BACKUS, MURRAY JAMES. 219 West 127th St., New York City.  
BAKER, ALBERT ASA. Civ. Engr., U. S. N., Naval Training Station, San  
Francisco, Cal.  
BEALL, PENDLETON. Engr. for D. P. Foley, 1344 Locust St., Cincinnati Ohio.  
BENSON, ROBERT CREWDSON. Asst. Engr. and Irrig. Expert, State Rivers and  
Water Supply Comm., Werribee, Victoria, Australia.  
BLUHM, HERMAN WILLIAM. 328 Guion Ave., Richmond Hill, N. Y.  
BOWEN, EDWARD WITHERS. 101 Virginia Ave., Danville, Va.  
BOWERMAN, EDWIN ROY. Engr., Jas. F. Leary Constr. Co., Inc., Lyons,  
N. Y.  
BURR, GEORGE LINDSLEY. Care, Rev. G. A. Strong, Fish Head, North Haven,  
Me.  
CARTER, CLARENCE REED. Draftsman, Gulf Pipe Line, Beaumont, Tex.  
CLARKE, ALFRED HENRY. Care, Bemis Bro. Bag Co., 40 Central St., Boston,  
Mass.  
COHEN, JACOB XENAB. Designing Engr., Sewage Disposal Works, Intercept-  
ing Sewer Board, 104 City Hall, Syracuse, N. Y.  
CONNELLY, WALTER LOUIS. 86 Park Pl., Newark, N. J.  
COOPER, CLARENCE WINSTON. 319 Dick St., Fayetteville, N. C.  
CROLL, HERBERT GREISS. Designer with City of Toronto, 231 Fulton Ave.,  
Toronto, Ont., Canada.  
DAUBENSPECK, HARRY ROSS. 405 Custom House, Cincinnati, Ohio.  
DAVIS, WILLIAM EILERT. Asst. Res. Engr., California Highway Comm., Box  
551, Davis, Cal.  
DE MEY, EDOUARD JEAN BERNARD. Constr. Engr., Toupet, Beil & Conley,  
Inc., 730 Oliver Bldg., Pittsburgh, Pa.

JUNIORS (*Continued*)

- DENNIE, FRANK EDWARD. Director, Dept. of Athletics, Univ. of Missouri. School of Mines and Metallurgy, Rolla, Mo.
- DIMMLER, CHARLES LOUIS. Structural Engr., Div. of Valuation, Interstate Commerce Comm., San Francisco, Cal.; address, 1911 Cedar St., Berkeley, Cal.
- DONLE, EARL RAYMOND. Road Engr., Barrett Mfg. Co., Boston (Res., 99 Commonwealth Ave., Springfield), Mass.
- DUFF, CARL MATHIAS. Versailles, Mo.
- FLAGG, HERBERT JUDSON. 1119 Yakima Ave., Seattle, Wash.
- FOLLIN, JAMES WIGHTMAN. Care, State San. Engr., 621 Oakland Bldg., Lansing, Mich.
- GIFFELS, WILLIAM CHARLES. Asst. Engr., Fargo Eng. Co., 502 North 8th St., La Crosse, Wis.
- GONS, LOUIS RICHARD. 110 Halleck Ave., Brooklyn, N. Y.
- GOODFELLOW, JAMES GORDON. 49 Arden St., Edinburgh, Scotland.
- GORDON, SAMUEL. Civ. Engr., U. S. N., U. S. Naval Coal Depot, San Diego, Cal.
- GUISSINGER, JOHN ADAM. Care, Cleburne Hotel, Helena, Ark.
- HAMILTON, PETER DAVIDSON GUNN. 148 Dedham Ave., Needham, Mass.
- HASWELL, JOHN ROBERT. Drainage Engr., Office of Public Rds. and Rural Eng., U. S. Dept. of Agriculture, Washington, D. C. (Res., 606 Lennox St., Baltimore, Md.).
- HAZEN, RALPH WILLIAM. Care, Hastings Pavement Co., 25 Broad St., New York City.
- HORWEGE, ALVIN ARTHUR. City Engr., 922 B St., Petaluma, Cal.
- JESSUP, WALTER EDGAR. 1005 Brent Ave., South Pasadena, Cal.
- KHACHADOORIAN, HAROOTUN HOVHANNES. Civ. Engr., Cavicchi & Pagano, Musquodoboit Harbor, N. S., Canada.
- KORNFELD, HARRY. Metaline Falls, Wash.
- LAUGHLIN, HARMONY LEONIDAS. 1819 Lyndale Ave., South, Minneapolis, Minn.
- LEWIS, HAROLD MACLEAN. 1511 Albemarle Rd., Brooklyn, N. Y.
- MCCASSY, STANLEY. Valuation Dept., C., R. I. & P. R. R., 1133 La Salle St. Station, Chicago, Ill.
- McGEE, HAROLD GILBERT. Cor., Winthrop and Edward Sts., Jackson, Mich.
- MAGOR, STUART FABIAN. Supt., Grading, West Coast Eng. Co., 309 West 5th St., Los Angeles, Cal.
- MASSEI, CAESAR. 1524 Franklin Rd., Roanoke, Va.
- MATTHEWS, WARREN SHEPARD. Room 628, Park Row Bldg., New York City.
- MILLARD, CURTISS. North Egremont, Mass.
- NEVIUS, SEARLE BROWN. Structural Engr.; Designer with Panama-Pacific International Exposition, 45 Monte Vista Ave., Oakland, Cal.
- PARTRIDGE, JOHN FREDRICK. Care, Redwood Manufactures Co., 1600 Hobart Bldg., San Francisco, Cal.

JUNIORS (*Continued*)

- PEARSON, HARRY BROWNLEY, JR. Asst. Engr., Coal & Coke Ry., Gassaway, W. Va.
- PHALEN, JOHN JOSEPH FRANCIS. 211 Paul Bldg., Utica, N. Y.
- RAKESTRAW, CHARLES LYSANDER. 320 Forty-fifth St., Oakland, Cal.
- RICHARDS, GEORGE WILLIAM. Ewing, Mass.
- ROBINSON, RUSSELL MOORE. 4515 Magnolia Ave., Chicago, Ill.
- ROSE, ALSTON ORANGE. With Herbert W. Hatton, Clayton, Del.
- RUSSELL, ALEXANDER STUART. General Delivery, Hermosa Beach, Cal.
- SANDELANDS, EDWARD BURCHARD. Insp., U. S. Engr. Dept., 1805 Tremont St., Galveston, Tex.
- SCOTT, WALTER VANDERBELT. With Turner Constr. Co., Prudential Bldg. (Res., 757 Crescent Ave.), Buffalo, N. Y.
- SERRA, JULIUS HERSCHEL. 1598 East 18th St., Brooklyn, N. Y.
- SHAPLEIGH, CHARLES HENRY. Asst. Engr. to the Asst. to Pres., N. O. & N. E. R. R., 1002 Q. & C. Bldg., New Orleans, La.
- SHEPPARD, NORMAN KIRKWOOD. 86 Park Pl., Newark, N. J.
- SLEPPY, KIRBY BALDWIN. Care, C. H. Lee, Central Bldg., Los Angeles, Cal.
- SMALLMAN, RALPH ALCORN. (Smallman-Brice Co.), 1301 Am. Trust Bldg., Birmingham, Ala.
- SMITH, WILLIAM ANDREW. Rifle, Colo.
- STANFORD, JAMES LELAND. Hamilton, Ga.
- SWICKARD, JAMES BLAINE. Care, County Surv., Salinas, Cal.
- SWINTON, ROY STANLEY. Charlevoix, Mich.
- TALBOT, KENNETH HAMMET. Div. Engr., Inspection and Information Bureau, Universal Portland Cement Co., 522 Frick Bldg., Pittsburgh, Pa.
- THACKWELL, HENRY LAWRENCE. Civ. and Hydr. Engr., 1700 East 23d Ave., Denver, Colo.
- TOLMAN, EDWARD MAYO. Director, Div. of San. Eng., West Virginia State Board of Health, Charleston, W. Va.
- VAN ETTEEN, PERCY HIXON. Asst. Engr., San Joaquin Val. Farm Lands Co., San Joaquin, Cal.
- VAUGHN, ROMNEY LEIGH. Care, Standard Am. Dredging Co., 414 Thirteenth St., Oakland, Cal.
- WALL, EDWARD WALTHER. 609 Querbes St., Montreal, Que., Canada.
- WARKLEY, JOHN CROSWELL. Illinois Central Station, Room 1000, Chicago, Ill.
- WHITE, ROY ALLERT. Care, State Highway Comm., Engadine, Mich.
- WHITNEY, CHARLES SMITH. 600 Riverside Drive, New York City.
- WHITNEY, JOHN THAD. U. S. Engr. Office, Dam No. 14, Ohio River, R. F. D. No. 1, Clarington, Ohio.
- WILDISH, FREDERIC NEWTON. Care, Eng. Dept., Office Engr. of Bldgs., C., B. & Q. R. R., Chicago, Ill.
- YOUNG, GEORGE LELAND. Care, Alaskan Eng. Comm., Anchorage, Alaska.

## REINSTATEMENTS

## JUNIORS

	Date of Reinstatement.
GREPE, JOHN STANLEY, JR.....	May 5, 1915
WALL, EDWARD WALTER.....	July 7, 1915

## RESIGNATIONS

## ASSOCIATE MEMBER

	Date of Resignation.
KREUGER, IVAR.....	July 6, 1915

## ASSOCIATE

CHAUSSÉ, ALCIDE.....	May 5, 1915
----------------------	-------------

## DEATHS

- BARNES, EDWARD HARDING. Elected Member, December 5th, 1906; died May 15th, 1915.
- BOWMAN, AUSTIN LORD. Elected Associate Member, September 7th, 1892; Member, December 1st, 1897; died June 3d, 1915.
- CARPENTER, JAMES WILHELM. Elected Junior, February 28th, 1911; Associate Member, June 24th, 1914; died June 10th, 1915.
- CHAPIN, LOOMIS EATON. Elected Junior, December 3d, 1884; Associate Member, September 7th, 1892; Member, November 4th, 1896; died June 21st, 1915.
- COWAN, HERBERT WHEELER. Elected Member, June 3d, 1908; died May 29th, 1915.
- DAVIES, WILLIAM GOMER. Elected Junior, February 2d, 1904; Associate Member, November 8th, 1909; died May 9th, 1915.
- DERRICK, HENRY CLAY. Elected Member, October 5th, 1887; died May 9th, 1915.
- FLEMING, Sir SANDFORD. Elected Member, September 18th, 1872; died July 22d, 1915.
- FRENCH, ALEXIS HENRY. Elected Member, June 6th, 1894; died May 3d, 1915.
- HANDBURY, THOMAS HENRY. Elected Member, February 3d, 1904; died April 24th, 1915.
- HICKEY, LOUIS THOMAS FRANKLIN. Elected Associate Member, June 24th, 1914; died May 18th, 1915.
- HOPKINS, ALBERT LLOYD. Elected Junior, April 3d, 1894; Associate Member, April 3d, 1901; died May 7th, 1915.
- HUGHES, WILLIAM MACKENZIE. Elected Member, June 2d, 1880; died June 25th, 1915.
- JEWETT, WILLIAM CORNELL. Elected Member, June 3d, 1885; died May 2d, 1915.
- MILLER, JAMES BLAINE. Elected Associate Member, April 2d, 1913; died May 18th, 1915.

- PEARSON, FRED STARK. Elected Member, November 3d, 1897; died May 7th, 1915.
- PIKE, RALPH ASHUR. Elected Junior, March 6th, 1906; Associate Member, January 31st, 1911; died May 13th, 1915.
- ROSE, CHARLES CLEMONS. Elected Member, April 4th, 1888; died July 17th, 1915.
- STEPHENS, CLINTON F. Elected Member, September 5th, 1877; died May 12th, 1915.
- STEVENS, HAROLD CROSBY. Elected Junior, December 31st, 1913; died May 23d, 1915.
- STOREY, FRANK BURNS. Elected Junior, March 5th, 1912; died April 21st, 1915.
- TURNER, EDMUND KIMBALL. Elected Member, November 4th, 1891; died May 6th, 1915.
- WARD, CHARLES DOD. Elected Member, March 3d, 1869; died July 30th, 1915.
- WILLIAMSON, FRANK ROBERT. Elected Member, November 7th, 1906; died July 11th, 1915.

---

**Total Membership of the Society, August 5th, 1915.**

**7 786.**

# MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(May 4th to July 24th, 1915)

NOTE.—This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

## LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

- |   |   |
|---|---|
| (1) <i>Journal</i> , Assoc. Eng. Soc., St. Louis, Mo., 30c.                           | (30) <i>Annales des Travaux Publics de Belgique</i> , Brussels, Belgium, 4 fr.                          |
| (2) <i>Proceedings</i> , Engrs. Club of Phila., Philadelphia, Pa.                     | (31) <i>Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand</i> , Brussels, Belgium, 4 fr. |
| (3) <i>Journal</i> , Franklin Inst., Philadelphia, Pa., 50c.                          | (32) <i>Mémoires et Compte Rendu des Travaux</i> , Soc. Ing. Civ. de France, Paris, France.             |
| (4) <i>Journal</i> , Western Soc. of Engrs., Chicago, Ill., 50c.                      | (33) <i>Le Génie Civil</i> , Paris, France, 1 fr.   |
| (5) <i>Transactions</i> , Can. Soc. C. E., Montreal, Que., Canada.                    | (34) <i>Portefeuille Economiques des Machines</i> , Paris, France.                                      |
| (6) <i>School of Mines Quarterly</i> , Columbia Univ., New York City, 50c.            | (35) <i>Nouvelles Annales de la Construction</i> , Paris, France.                                       |
| (7) <i>Gesundheits Ingenieur</i> , München, Germany.                                  | (36) <i>Cornell Civil Engineer</i> , Ithaca, N. Y.  |
| (8) <i>Stevens Institute Indicator</i> , Hoboken, N. J., 50c.                         | (37) <i>Revue de Mécanique</i> , Paris, France.   |
| (9) <i>Engineering Magazine</i> , New York City, 25c.                                 | (38) <i>Revue Générale des Chemins de Fer et des Tramways</i> , Paris, France.                          |
| (10) <i>Engineering</i> (London), W. H. Wiley, 432 Fourth Avenue, New York City, 25c. | (39) <i>Technisches Gemeindeblatt</i> , Berlin, Germany, 0, 70m.  |
| (11) <i>The Engineer</i> (London), International News Co., New York City, 35c.        | (40) <i>Zentralblatt der Bauverwaltung</i> , Berlin, Germany, 60 pfg.                                   |
| (12) <i>Engineering News</i> , New York City, 15c.                                    | (41) <i>Electrotechnische Zeitschrift</i> , Berlin, Germany.  |
| (13) <i>Engineering Record</i> , New York City, 10c.                                  | (42) <i>Proceedings</i> , Am. Inst. Elec. Engrs., New York City, \$1.                                   |
| (14) <i>Railway Age Gazette</i> , New York City, 15c.                                 | (43) <i>Annales des Ponts et Chaussées</i> , Paris, France.   |
| (15) <i>Engineering and Mining Journal</i> , New York City, 15c.                      | (44) <i>Journal</i> , Military Service Institution, Governors Island, New York Harbor, 50c.             |
| (16) <i>Electric Railway Journal</i> , New York City, 10c.                            | (45) <i>Colliery Engineer</i> , Scranton, Pa., 25c.   |
| (17) <i>Railway Review</i> , Chicago, Ill., 15c.                                      | (46) <i>Scientific American</i> , New York City, 15c.   |
| (18) <i>Scientific American Supplement</i> , New York City, 10c.                      | (47) <i>Mechanical Engineer</i> , Manchester, England, 3d.  |
| (19) <i>Iron Age</i> , New York City, 20c.  | (48) <i>Zeitschrift</i> , Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.                         |
| (20) <i>Railway Engineer</i> , London, England, 1s. 2d.                               | (49) <i>Zeitschrift für Bauwesen</i> , Berlin, Germany.   |
| (21) <i>Iron and Coal Trades Review</i> , London, England, 6d.                        | (50) <i>Stahl und Eisen</i> , Düsseldorf, Germany.  |
| (22) <i>Railway Gazette</i> , London, England, 6d.                                    | (51) <i>Deutsche Bauzeitung</i> , Berlin, Germany.  |
| (23) <i>American Gas Light Journal</i> , New York City, 10c.                          | (52) <i>Rigasche Industrie-Zeitung</i> , Riga, Russia, 25 kop.  |
| (24) <i>Railway Age Gazette</i> , Mechanical Edition, New York City, 20c.             | (53) <i>Zeitschrift</i> , Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria, 70h.     |
| (25) <i>Electrical Review</i> , London, England, 4d.                                  | (54) <i>Transactions</i> , Am. Soc. C. E., New York City, \$12.   |
| (26) <i>Electrical World</i> , New York City, 10c.                                    | (55) <i>Transactions</i> , Am. Soc. M. E., New York City, \$10.   |
| (27) <i>Journal</i> , New England Water-Works Assoc., Boston, Mass., \$1.             | (56) <i>Transactions</i> , Am. Inst. Min. Engrs., New York City, \$6.                                   |
| (28) <i>Journal</i> , Royal Society of Arts, London, England, 6d.                     |   |



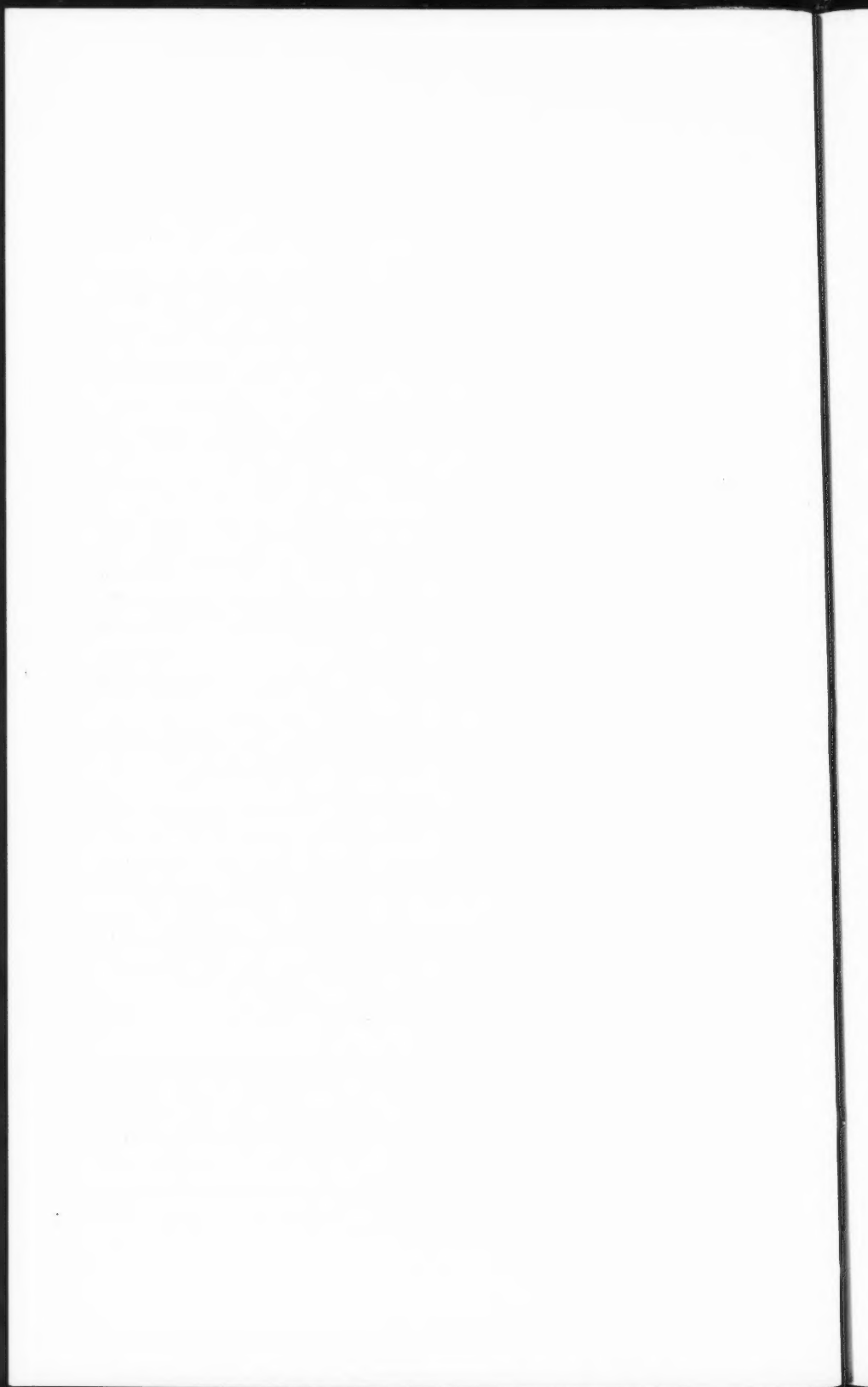
- (57) *Colliery Guardian*, London, England, 5d.  
 (58) *Proceedings*, Engrs.' Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.  
 (59) *Proceedings*, American Water-Works Assoc., Troy, N. Y.  
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.  
 (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.  
 (62) *Steel and Iron*, Thaw Bldg., Pittsburgh, Pa., 10c.  
 (63) *Minutes of Proceedings*, Inst. C. E., London, England.  
 (64) *Power*, New York City, 5c.  
 (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.  
 (66) *Journal of Gas Lighting*, London, England, 6d.  
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.  
 (68) *Mining Journal*, London, England, 6d.  
 (69) *Der Eisenbau*, Leipzig, Germany.  
 (71) *Journal*, Iron and Steel Inst., London, England.  
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.  
 (72) *American Machinist*, New York City, 15c.  
 (73) *Electrician*, London, England, 18c.  
 (74) *Transactions*, Inst. of Min. and Metal., London, England.  
 (75) *Proceedings*, Inst. of Mech. Engrs., London, England.  
 (76) *Brick*, Chicago, Ill., 20c.  
 (77) *Journal*, Inst. Elec. Engrs., London, England, 5s.  
 (78) *Beton und Eisen*, Vienna, Austria, 1, 50m.  
 (79) *Forschungsarbeiten*, Vienna, Austria.  
 (80) *Tonindustrie Zeitung*, Berlin, Germany.  
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.  
 (82) *Mining and Engineering World*, Chicago, Ill., 10c.  
 (83) *Gas Age*, New York City, 15c.  
 (84) *Le Ciment*, Paris, France.  
 (85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.  
 (86) *Engineering-Contracting*, Chicago, Ill., 10c.  
 (87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.  
 (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.  
 (89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., \$5.  
 (90) *Transactions*, Inst. of Naval Archts., London, England.  
 (91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.  
 (92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.  
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.  
 (95) *International Marine Engineering*, New York City, 20c.  
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.  
 (98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.  
 (99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, \$2.  
 (100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.  
 (101) *Metal Worker*, New York City, 10c.  
 (102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.  
 (103) *Mining Press*, San Francisco, Cal., 10c.  
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.  
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.  
 (106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.  
 (107) *Schweizerische Bauzeitung*, Zürich, Switzerland.  
 (108) *Iron Tradesman*, Atlanta, Ga., 10c.  
 (109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.  
 (110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.  
 (111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.  
 (112) *Internationale Zeitschrift für Wasser-Versorgung*, Leipzig, Germany.  
 (113) *Proceedings*, Am. Wood Preservers' Assoc., Baltimore, Md.

## LIST OF ARTICLES

## Bridges.

- Recent Thames Bridge and Tunnel Construction.\* (11) Serial beginning Apr. 30.  
 Apportionment of Cost of Highway Bridges Between Street Railways and Cities.\* Charles M. Spofford. (4) May.  
 Gatun River Bascule Bridge, Panama Railroad.\* P. L. Kaufman. (100) May.  
 The Design and Erection of the Pennsylvania Lift Bridge No. 458 Over the South Branch of the Chicago River. W. L. Smith and W. W. Priest. (4) May.  
 Detail Plans of Standard Concrete Box and Arch Culverts, St. Louis and San Francisco.\* A. M. Wolf. (87) May.  
 Substructure Features of a Bridge over the South Canadian River in Oklahoma and Erection Procedure Adopted.\* (86) May 5.  
 Concrete Viaduct of a New Type; Eastern Viaduct, New York Connecting R. R.\* (13) May 6.

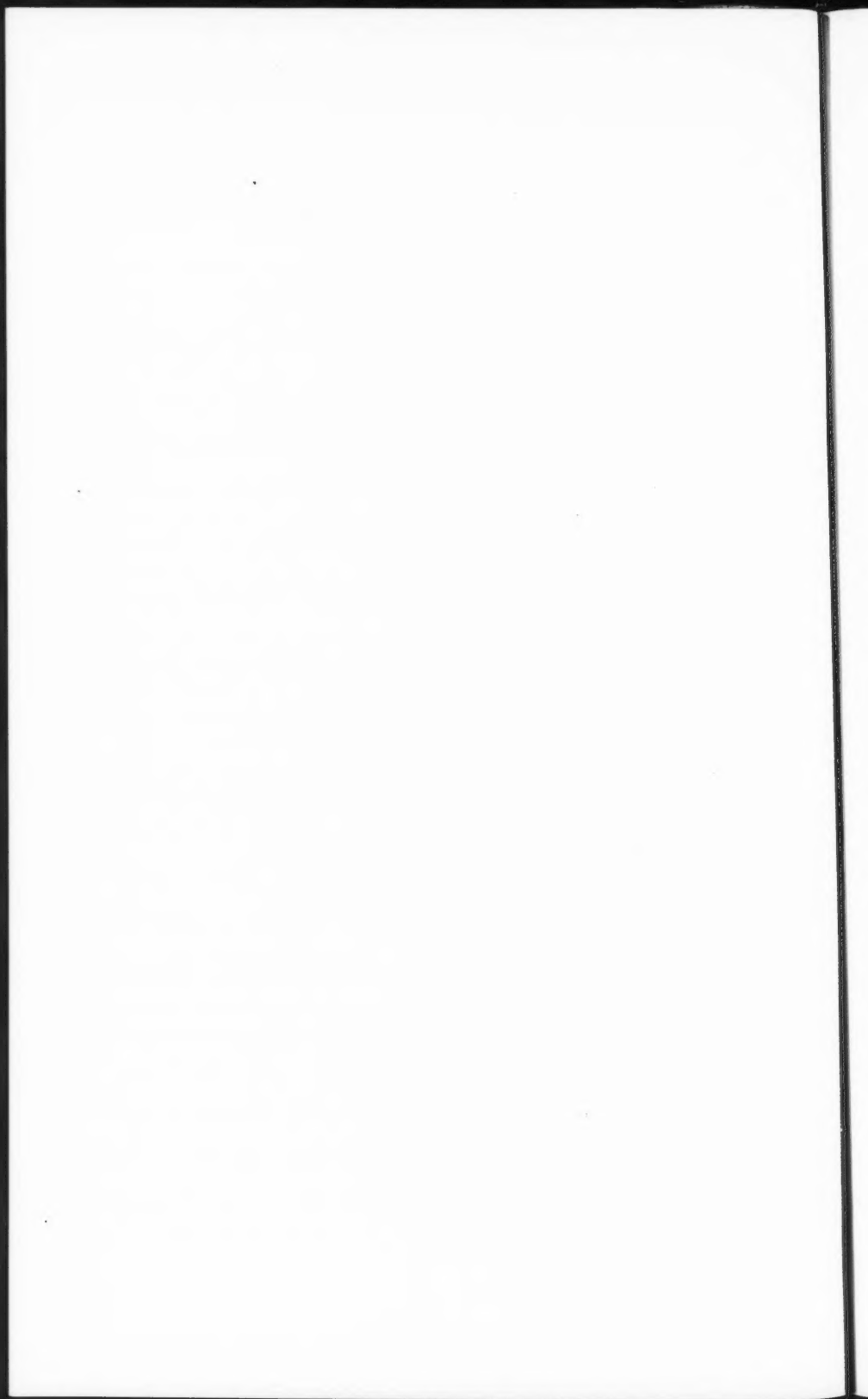
\* Illustrated.



**Bridges—(Continued).**

- The Cabrillo Bridge at the San Diego Exposition.\* (13) May 13.  
 A Small Bascule Bridge; Pere Marquette R. R.\* (13) May 13.  
 Bridge Completed over St. John River.\* (96) May 13.  
 Highway Arch Bridge, St. John, N. B.\* (96) May 13.  
 Special Conditions Govern Selection of Lift Bridge and Method of Erection.\* (14) May 15.  
 Lower Ganges Bridge of the Eastern Bengal Ry.\* (18) May 15.  
 New Overhead Bridge at Moose Jaw. (96) May 20.  
 Highway Bridge Approach Details.\* Frank Barber. (13) May 20.  
 Dropping Old Timber Trestles with Dynamite.\* James H. Stack. (15) May 21.  
 An Economical Method of Replacing Trusses with Girders.\* S. T. Corey. (15) May 21.  
 Elastic Yield of Rock Foundation of a Bridge Pier.\* (13) May 27.  
 Tests of Beam Connections (Cornell University in Co-operation with the American Bridge Company).\* (96) May 27.  
 Reinforced-Concrete Pipes Replace Girder Bridge.\* (14) May 29.  
 History of the Old Cumberland Valley Railroad Bridge at Harrisburg, and the Transverse Shifting of the Present Iron Structure.\* Thos. A. Baldwin. (98) June.  
 Culvert Construction, B. R. & P.\* A. M. Wolf. (87) June.  
 Design Features of the East Kansas Ave. Bridge Over the Kansas River at Kansas City, Kan.\* (86) June 2.  
 Viaduct Construction on the Kansas City Terminal Railway.\* A. R. Eitzen. (23) June 4.  
 Deterioration of Steel Bridges over Railway Tracks at Buffalo.\* R. J. Riedpath. (13) June 10.  
 The Pacific Highway Interstate Bridge Over the Columbia River and Its Approaches Between Vancouver, Wash., and Portland, Ore.\* (86) June 16.  
 Methods and Equipment Used in Erecting Girder Spans of Pennsylvania Ave. Viaduct, Kansas City, Mo. (86) June 16.  
 Hardinge Bridge over the Lower Ganges in India.\* F. C. Coleman. (13) June 17; (23) Apr. 23.  
 Reinforced-Concrete Sewer Viaduct.\* E. Dow Gilman. (13) June 17.  
 Concrete Bridges with Stone and Brick Facing.\* C. E. Drayer. (13) June 24.  
 Interstate Bridge over the Columbia River, Portland, Ore.\* E. E. Howard. (13) June 24.  
 New Ohio River Bridge to Contain Longest Riveted-Truss Spans in America.\* (14) June 26.  
 Some Features of Steel Viaducts.\* A. W. Hoffman, Assoc. M. Am. Soc. C. E. (87) July.  
 Wooden and Combination Highway Bridges.\* Glen Edgar Edgerton. (100) July.  
 New Bridge Across the Missouri River at Sibley, Mo.\* (15) July 2.  
 Special Pier and Floor Design Feature, Pacific Highway Interstate Bridge.\* (14) July 3.  
 Method and Equipment Used in Constructing the Superstructure of the Detroit-Superior High Level Bridge in Cleveland, O.\* (86) July 7.  
 Long-Span Continuous-Truss Bridge over the Ohio.\* (13) July 8.  
 Deep Bridge Piers Sunk without Air.\* (13) July 8.  
 Flat-Slab Bridges at Denver Combine Permanency and Good Appearance.\* Walter H. Wheeler. (14) July 10.  
 Tunkhannock Viaduct Nearing Completion.\* (14) July 10.  
 Longest Simple Truss Span in World to be Erected over Ohio River at Metropolis.\* (14) July 10; (15) July 23.  
 National Transcontinental Railway Bridges.\* A. S. Cook. (96) July 15.  
 Rebuilding the Muskingum Bridge near Coshocton.\* (13) July 15.  
 Steel Billets Needle Bridge Shoe in Quarters too Close for Beams.\* T. J. Wilkerson. (14) July 17.  
 Longest Riveted Simple Trusses Erected Around Old Bridge by Cantilever Method.\* (14) July 17.  
 Design, Construction, and Detailed Costs of a Reinforced Concrete Girder Bridge Over Red Cedar River, Michigan. R. A. Small. (86) July 21.  
 New Methods Evolved in Building World's Largest Bridge.\* (14) July 24.  
 Unusually High Retaining Walls of Cantilever Type.\* S. W. Bowen. (14) July 24.  
 Die Klappebrücke bei Sault Ste. Marie.\* W. Gutacker. (69) Dec., 1914.  
 Prüfung der Tragfähigkeit einer Gurtträgerbrücke bei Hamm in Westfalen.\* Max Möller. (51) Sup. 10.  
 Klappebrücke über den Hafen von Husum.\* (69) Jan.  
 Brückenumbauten zur Einführung elektrischer Zugförderung.\* Karl Pirath. (40) Jan. 9.  
 Ueber hölzerne Kriegsbrücken.\* G. Lang. (40) Feb. 20.  
 Vom Wettbewerb um den Umbau der Aspernbrücke über den Donaukanal in Wien.\* Friedrich Bleich. (69) Serial beginning Mar.

\* Illustrated.



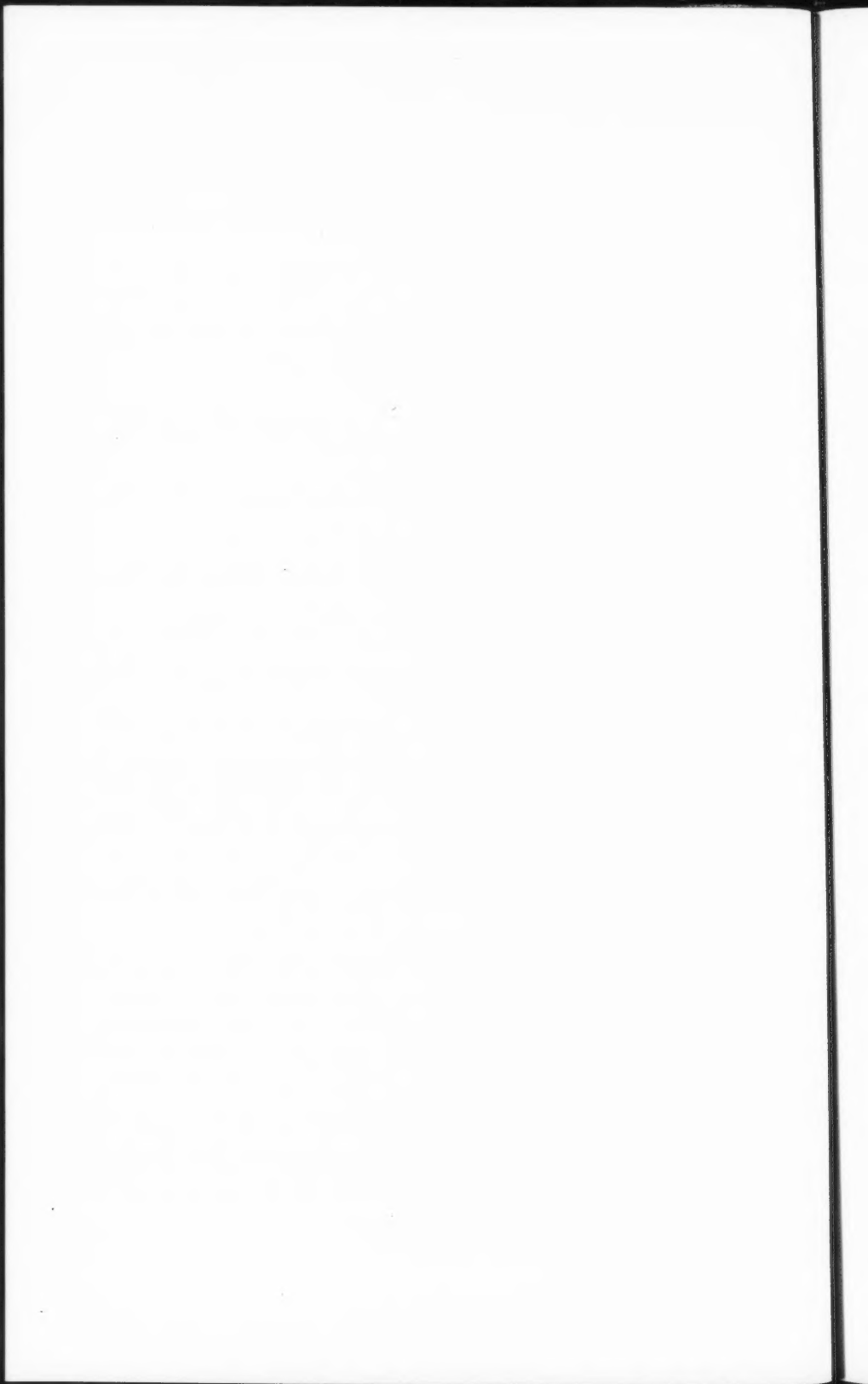
**Bridges—(Continued).**

- Die Verlängerung der Wienflusseinschwülbung und der Stadtbahneindeckung in der Strecke von der Leopoldsbrücke bis zur Magdalenenbrücke.\* Martin Paul. (53) Serial beginning Apr. 23.
- Die hölzerne Birn-Brücke bei Münchenstein.\* (107) May 1.
- Zwei Steifrahmenbrücken in Eisenbeton.\* Georg Spielmann. (78) May 3.
- Ideen-Wettbewerb für den Pont Butin, Genf.\* (107) May 8.
- Die Verstärkung der Kirchenfeldbrücke über die Aare in Bern.\* A. Rohm. (107) Serial beginning May 15.
- Beitrag zur Theorie der Hängebrücken mit aufgehobenem Horizontalzug.\* W. Schachenmeier. (48) Serial beginning May 29.
- Versuche mit Druckstaben für die Neue Quebeckbrücke.\* Bohny. (50) June 17.
- Lastverteilung bei Plattenbalkenbrücken.\* A. Bühler. (107) July 3.

**Electrical.**

- The Electrolytic Insulation of Aluminum Wire.\* C. E. Skinner and L. W. Chubb. (Paper read before the American Electro-Chemical Society.) (73) Apr. 23.
- The Case for the Electrification of Engineering Works. Ernest P. Hollis. (26) Apr. 23.
- A Pelton Wheel for High Pressure.\* (12) Apr. 30.
- Press Button Control for an Electric Traverser.\* (12) Apr. 30.
- The English Electrotechnical Industry and the Russian Market. P. Gurewitsch. (73) Serial beginning Apr. 30.
- Towers for Radio-Telegraph Stations.\* (12) Apr. 30.
- Rational Rating for Filament Lamps. S. M. Powell. (26) Apr. 30.
- Lifting Magnets.\* (12) Apr. 30.
- The Flow of Energy Through Transmission Lines.\* Robert A. Philip. (4) May.
- The Industrial Power Committee (American Institute of Electrical Engineers). (42) May.
- The Phase Angle of Current Transformers.\* (42) May.
- The Multiplex Cost and Rate System. Otto B. Goldman. (42) May.
- The Reluctance of Some Irregular Magnetic Fields.\* John F. H. Douglas. (42) May.
- Industrial Motor Applications: Some Considerations Affecting the Choice of Motor and Auxiliary Equipment in the Metallurgical and Chemical Industries. H. B. Barnes. (105) May.
- Direct Connected Exciters.\* (111) May 1.
- Electrical Porcelain: I. Testing with a High-Frequency Oscillator. II. The Problematical Points of Manufacture. III. Experiences and Experimental Investigations.\* E. E. F. Creighton. (42) May.
- Provisional Specification for Insulator Testing, Covering Inspection and Tests of High-Tension Line Insulators of Porcelain, for over 25 000 Volts. (42) May.
- An Improved Diaphragm Material, Electro-Filtros. C. J. Thatcher. (105) May.
- Classification of Alternating-Current Motors.\* Val A. Fynn. (42) May.
- Steel Mill Controllers from the Operator's Standpoint.\* J. S. Riggs. (42) May.
- Control of Direct-Current Hoists in Iron and Steel Mills.\* G. E. Stoltz and W. O. Lum. (42) May.
- Municipal Water and Light Plant of Kansas City, Kansas.\* P. W. Morgan. (60) May.
- Alternating-Current Controllers for Steel Mills.\* Arthur Simon. (42) May.
- Methods of Testing the Scherbius Compensator.\* Abdel Aziz Ahmed. (77) May 1.
- New Switchboard Devices Designed by the U. S. Lighthouse Service.\* (111) May 1.
- Federal Power House, Boise, Idaho.\* A. P. Connor. (64) May 4.
- Interior Wiring for Lighting and Power Service. A. L. Cook. (64) Serial beginning May 4.
- A Method of Determining the Phase Angle of Current and Potential Transformers. R. D. Gifford. (73) May 7.
- High-Tension Switch Gear Arrangements.\* T. T. Evans. (From *Westinghouse Gazette*.) (12) May 7.
- The Rheostatic Control of Separately Excited Generators.\* L. Boothman. (26) May 7.
- The Kenotron Rectifier.\* Saul Dushman. (From *General Electric Review*.) (26) May 7; (73) May 28.
- Photo-Electricity. J. A. Fleming. (11) May 7.
- The Alternate-Current Potentiometer as a Standard Instrument.\* Charles V. Drysdale. (73) May 7.
- Protective Devices Against Lightning and Surges. E. Kilburn Scott and L. F. Fogarty. (Paper read before the Association of Mining Electrical Engineers.) (73) May 7.
- Chemical Reactions at Low Pressures. (Tungsten Lamps.) Irving Langmuir. (11) May 7.

\* Illustrated.

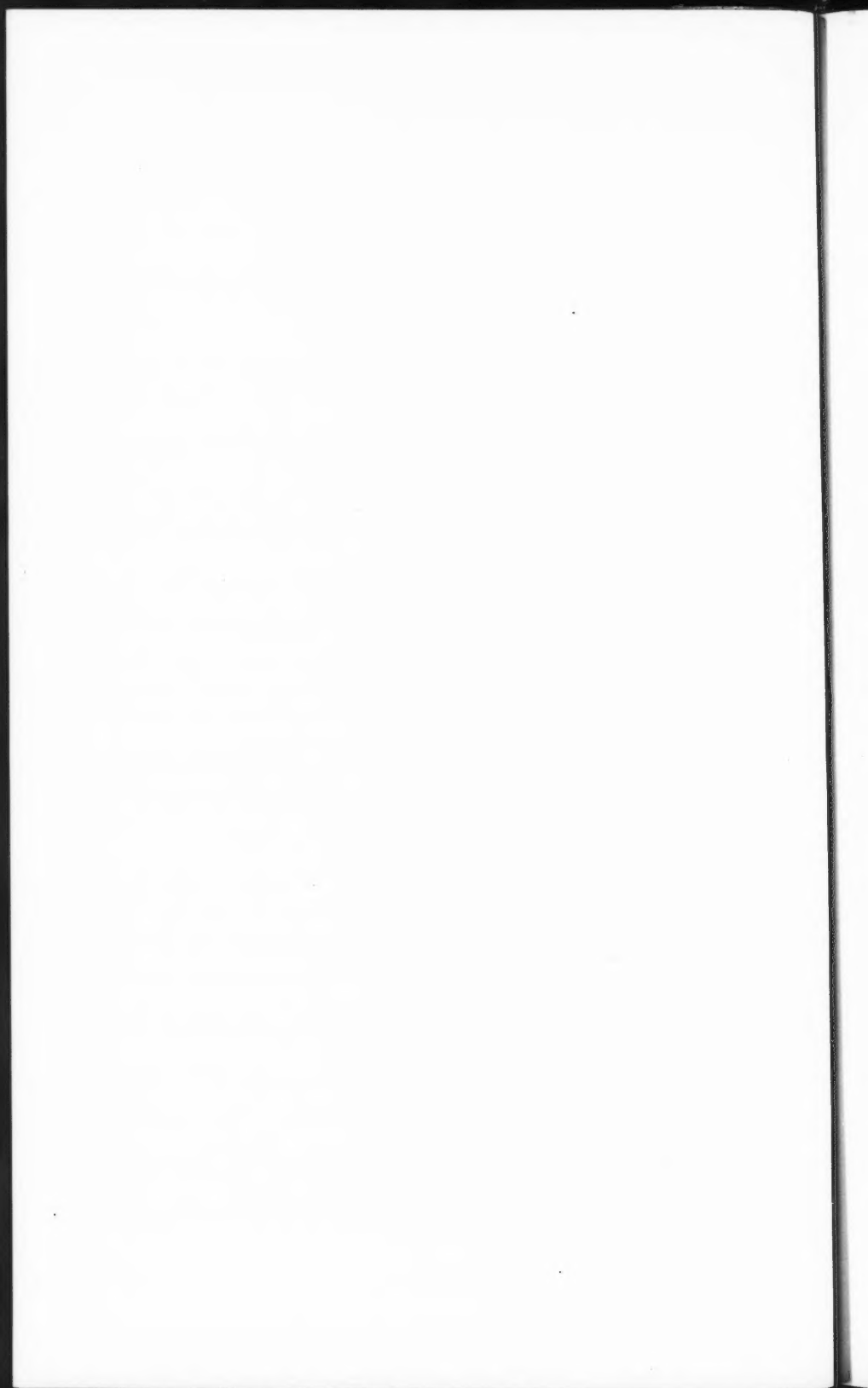




**Electrical—(Continued).**

- Bearing Currents.\* E. G. Merrick. (73) May 7.  
 Bearings of Electrical Machinery.\* Andrew Gibson. (Paper read before the Association of Mining Electrical Engineers.) (22) May 7.  
 New Rates of New York Edison Company. (27) May 8.  
 Enlarging a Steam Reserve Station: Problems Involved in Rehabilitating the Consolidated Gas, Electric Light & Power Company's Westport Station.\* Jay C. Lathrop. (27) May 8.  
 Utah Power & Light Company's System.\* (111) May 8.  
 Motor Service in a Large Bolt Factory.\* (27) May 8.  
 The Cost of Combination Electric Service.\* (27) May 8.  
 Experiences of Small-Plant Operator.\* E. B. Pollister. (Paper read before the National Electric Light Association.) (27) May 8.  
 Nitrogen-Filled Lamps in Chicago.\* (27) May 8.  
 Calculation of the Performance of an Induction Motor. Waldo V. Lyon. (27) Serial beginning May 8.  
 Standardizing of Distributing Stations in Ontario.\* (96) May 13.  
 Electric Apparatus Records. G. E. Stoltz. (From paper read before the Association of Iron and Steel Electrical Engineers.) (20) May 13.  
 Automatic-Lift Accidents.\* Frank Broadbent. (26) May 14.  
 Electricity Supply at Ahmedabad, India.\* (26) May 14.  
 Electricity Works Extensions at South Shields.\* (26) May 14; (73) May 14.  
 Large Electric Furnace of Routine Foundry Work. (26) May 14.  
 The Use of Electric Power in Pumping Water for Irrigation. H. Day Hanford. (Abstract of paper read before the Washington Irrigation Institute.) (111) May 15.  
 Kansas City Union Station Lighting.\* (27) May 15.  
 New Power Station for Havana.\* C. W. Ricker. (17) May 15; (27) May 15.  
 Wood Green Electric Generating Station.\* (12) May 21; (26) May 21; (66) May 18.  
 The Pure Electron Discharge and Its Application in Radio Telegraphy and Telephony.\* Irving Langmuir. (Paper read before the American Institute of Radio Engineers.) (73) May 21.  
 Some Notes on Shunt Regulating Resistances.\* Thomas Carter. (26) Serial beginning May 21.  
 The Effects of Insulation Resistance on Armoured Cables. A. Gavand. (Abstract from *La Lumière Electrique*.) (73) May 21.  
 Standardisation Rules for Electrical Machinery (Excluding Railway and Tramway Motors).\* (26) May 21.  
 Electricity Supply at Karachi, India.\* (26) May 21; (73) May 21.  
 Balance Systems of Protection.\* C. C. Garrard. (73) Serial beginning May 21.  
 Power Supply on the Rand.\* Bernard Price. (Paper read before the South African Institute of Electrical Engineers.) (73) May 21.  
 The Unit of Candle-Power in White Light. Clifford C. Paterson and B. P. Dudding. (Abstract of paper read before the Physical Society.) (73) May 21.  
 The Lock-Out Contactor.\* (73) May 21.  
 Three-Phase Electric Cranes at the Port of Bordeaux. (26) May 21.  
 Electric Bells.\* C. Turnbull. (73) May 21.  
 A 480-Ft.-Head Vermont Water-Power.\* (27) May 22.  
 Differential Method for the Determination of Losses in Coils.\* August Hund. (27) May 22.  
 Operating Cost of Commercial Electric Vehicles. William P. Kennedy. (27) May 22.  
 The Brunots Island Generating Station: Main Power House of the Duquesne Light Company of Pittsburgh, Pa., Serving a Population of 1 000 000.\* F. Uhlenhaut, Jr. (27) May 22.  
 Storage Battery Serving Combined Alternating-Current and Direct-Current System.\* (27) May 22.  
 Tucson's Ornamental Lighting System.\* (111) May 22.  
 Harrisburg, Ill., Railway and Power Plant.\* Thomas Wilson. (64) May 25.  
 The Pilotron in Wireless Telegraphy and Telephony.\* Irving Langmuir. (26) May 28.  
 A Motor Searchlight Plant.\* (26) May 28.  
 Frictional Electricity on Insulators and Metals.\* W. Morris Jones. (73) May 28.  
 The Economy of Electric Vehicles.\* (73) May 28.  
 Single and Multiple Ground-Wire Antennæ.\* (26) May 28.  
 The Passage of Electricity through Metals. Sir J. J. Thomson. (Paper read before the Institute of Metals.) (73) May 28.  
 Load Factor, Output and Cost.\* C. Ashmore Baker. (26) May 28.  
 Currents in Bearings of Electric Generators.\* W. Buchanan. (73) May 28.  
 Methods of Measuring the Strength of Wireless Signals.\* E. W. Marchant. (Paper read before the Wireless Society of London.) (73) May 28.  
 Developments in Electromagnetism. Eugene Bloch. (Translation from *Revue Generale des Sciences Pures et Appliquees*.) (19) Serial beginning May 29.

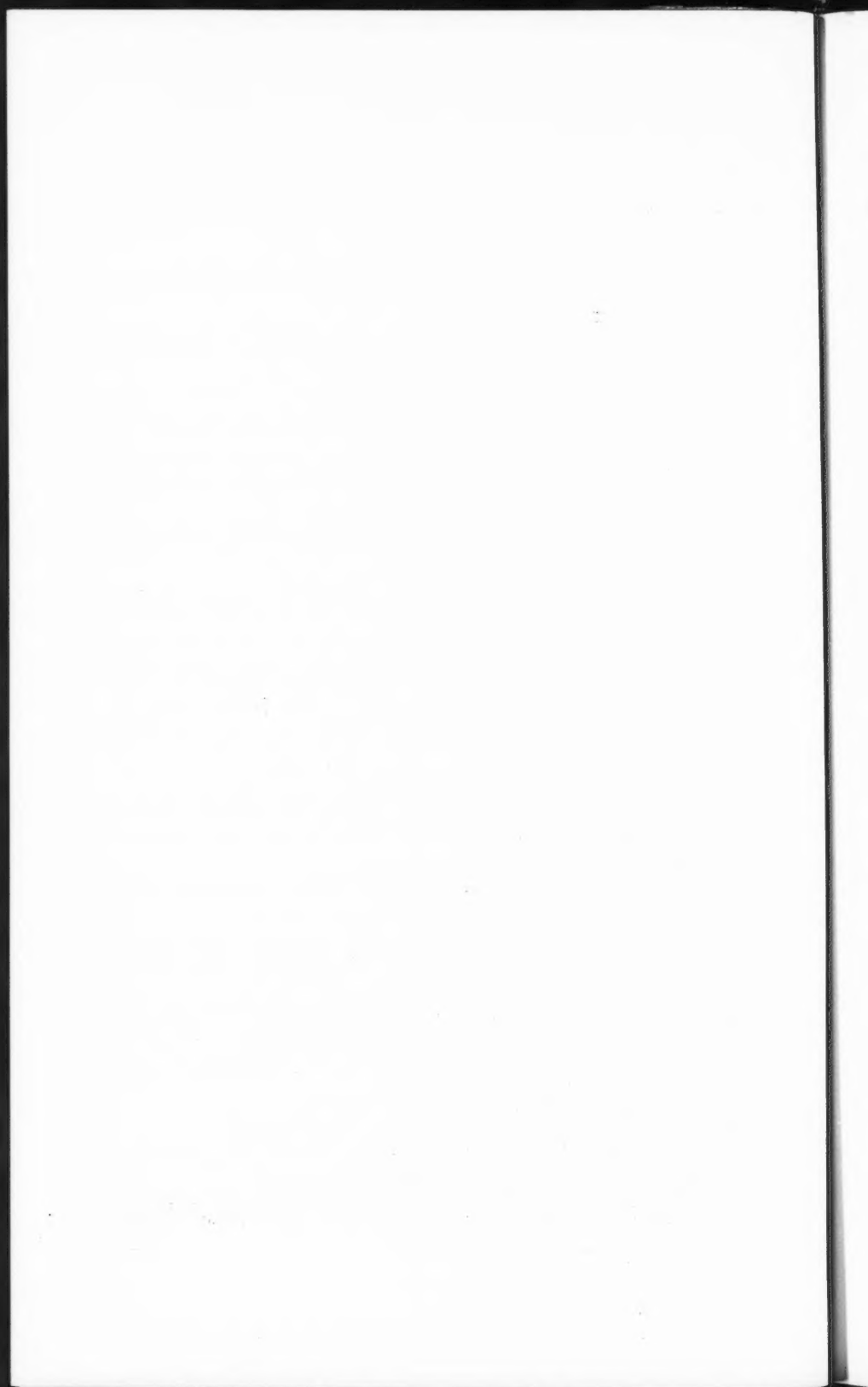
\* Illustrated.



**Electrical—(Continued).**

- Design of Transmission Towers for the Cohoes Hydroelectric Plant Analyzed.\* (14) May 29.
- Proper Care of Transformers. E. A. Quinn. (111) May 29.
- Irrigation Pumping in the Coast States (Electric Pumping).\* (27) May 29.
- Electric Developments on the Pacific Coast: High Operating Heads, Huge Water-Power Units, and Long Transmissions at Pressures up to 150 000 Volts, Characterize Great Coast Systems.\* (27) May 29.
- Interconnected Systems Serving San Francisco.\* (27) May 29.
- Supervising 840 Miles of Lines: How the Load Dispatcher of the San Joaquin (Cal.) System Adjusts Even Plant Water Supply.\* L. J. Moore. (27) May 29.
- The Work of the Load Dispatcher.\* R. R. Robley. (27) May 29.
- Good Lighting and Its Immediate Effects from the Economic Standpoint.\* V. H. Mackinney and E. Stroud. (77) June 15.
- Modern Power-House Condensing Plant. Arthur Arnold. (77) June 15.
- The Utilization of Waste Heat for the Generation of Electrical Energy.\* H. Hobson. (77) June 15.
- Incremental Armature Copper Losses at No-Load and Armature Teeth Eddy-Current Losses.\* A. Press. (77) June 15.
- The Magnetic Behaviour of Iron Under Alternating Magnetization of Sinusoidal Wave-Form.\* N. W. McLachlan. (77) June 15.
- The Ionizing Potentials of an X-Ray Tube.\* E. C. Drew. (3) June.
- Overhead Contact Systems, Construction and Costs.\* E. J. Amberg. (42) June.
- The Calibration of Current Transformers by Means of Mutual Inductance.\* Charles Fortescue. (42) June.
- The Induction Watt-Hour Meter.\* V. L. Hollister. (42) June.
- Electricity in Grain Elevators.\* H. E. Stafford. (42) June.
- Foundations for Transmission Line Towers and Erection of Towers.\* Part I, J. A. Walls. Part II, J. B. Leeper. Part III, W. E. Mitchell. Part IV, P. M. Downing. (42) June.
- Irregular Wave Forms: I, Form Factor and Its Significance.\* Frederick Bedell. (42) June.
- Irregular Wave Forms: II, Distortion Factors.\* Frederick Bedell. (42) June.
- Irregular Wave Forms: III, An Analytical and Graphical Solution for Non-Sinusoidal Alternating Currents.\* F. M. Mizushi. (42) June.
- Construction, Maintenance and Cost of Overhead Contact Systems: Part II, Catenary Construction.\* F. Zogbaum. (42) June.
- An Investigation of Dielectric Losses with the Cathode Ray Tubes.\* John P. Minton. (42) June.
- Fields of Motor Application. David B. Rushmore. (42) June.
- First Uniflow Plant on Pacific Coast.\* (64) June 1.
- Power Plant of the Hughes Electric Co.\* C. P. Larsen. (64) June 1.
- The Trend in Design of Modern Regulating Rheostats for Electrical Machine Excitation Control.\* L. Boothman. (73) June 4.
- Ionomagnetic Rotations. A. Righi. (Abstract from *Atti, Assoc. Elet. Italiana.*) (73) June 4.
- Wireless Telephony.\* H. J. Round. (73) June 4.
- Developments in the Pacific Northwest.\* (111) June 5.
- Western Hydroelectric Transmission Developments.\* (Report of Committee of the National Elec. Light Assoc.) (111) June 5.
- Calculation of Illumination.\* Richard C. Powell. (27) June 5.
- Transmission at 130 000 Volts in Utah.\* (27) June 5.
- Kansas City Terminal Power Plant: The 2 500-Kw. Alternating-Current Station Serving New Union Depot, Office Building, Yards, Shops, etc.\* (27) June 5.
- Power Plant of New Lumber Exchange Building.\* Thomas Wilson. (64) June 8.
- Core Losses in Series Motor.\* T. M. Robie. (64) June 8.
- Method of Erecting Marconi Masts.\* L. H. Peebles. (13) June 10.
- Apparatus for Protecting Electrical Machinery Against Abnormal Electrical Conditions. C. C. Garrard. (73) Serial beginning June 11.
- Illumination of the Panama Pacific Exposition.\* W. D'A. Ryan. (From the *General Electric Review.*) (19) June 12; (27) May 29.
- Some Notes on Modern Methods of Electric Welding and Their Application.\* H. S. Marquand. (77) June 15.
- Recent Extension of Plant at Salford.\* (73) June 18.
- Use of Electricity in a Newspaper Plant.\* (27) June 19.
- Engineering Features of Cleveland Station.\* (27) June 19.
- Factors Affecting Commutation.\* Arthur H. Brame. (64) June 22.
- The 600-Ft. Self-Supported Radio Towers at Darien.\* Ira W. Dye. (13) June 24.
- Engineering Plants at the Regent Palace Hotel.\* (73) June 25.
- The Thomas Transmission as Applied to a 200 H. P. Loco-Coach.\* (73) June 25.
- Electric Line Distribution Conditions in the Pacific Northwest. J. C. Martin. (Paper read before the National Elec. Light Assoc.) (111) Serial beginning June 26.

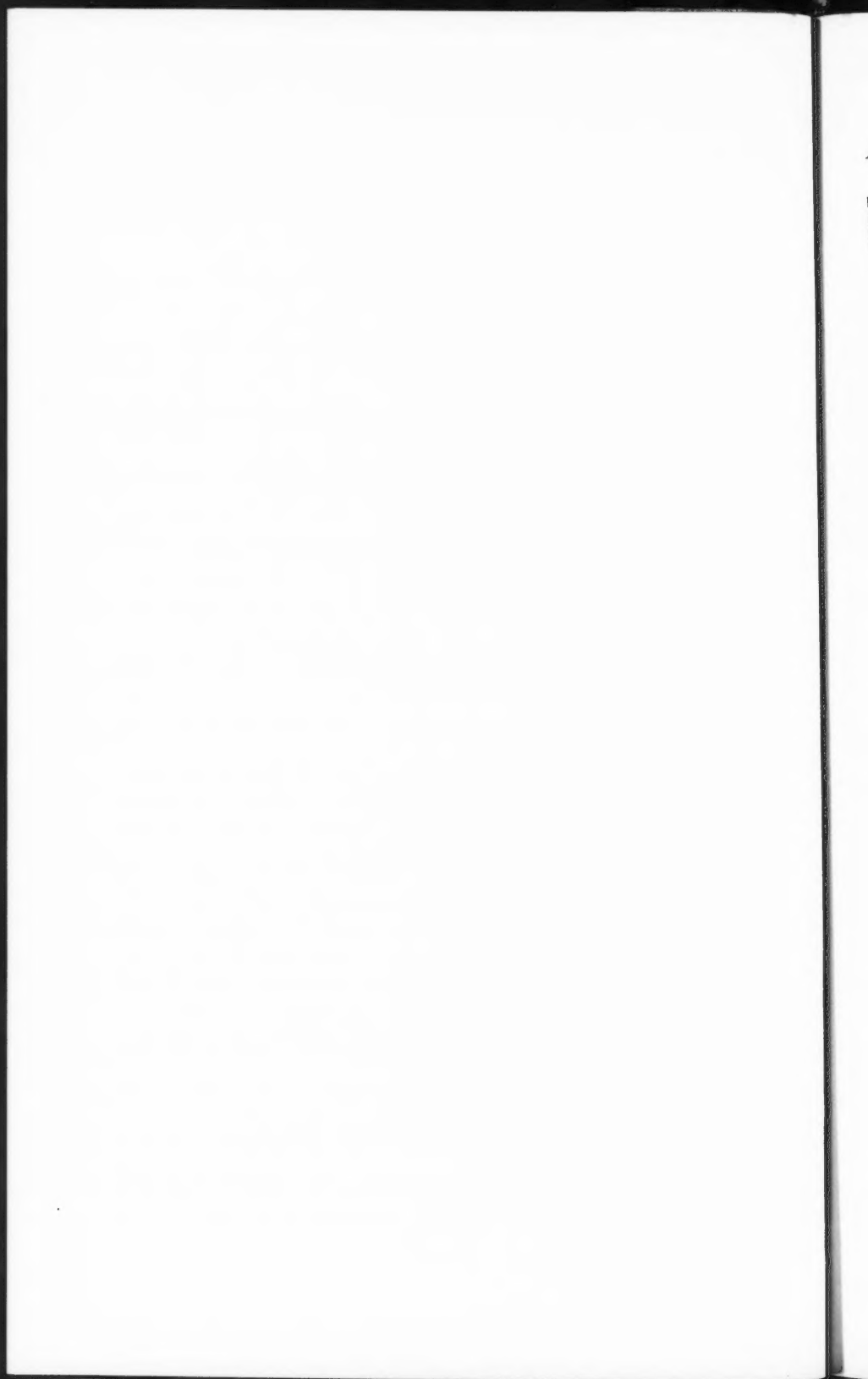
\* Illustrated.



**Electrical—(Continued).**

- Washington Avenue Power Plant, Scranton, Penn.\* Warren O. Rogers. (64) June 29.
- Where Electric Motors Can Be Used.\* Thomas Robson Hay. (9) July.
- The Rossiter, Pa., Power Plant.\* (45) July.
- Control and Protection of Electric Systems. Charles Proteus. (3) July.
- Four Years' Operating Experience on a High-Tension Transmission Line.\* A. Bang. (42) July.
- The Classification of Electromagnetic Machinery.\* F. Creedy. (42) July.
- The Effective Illumination of Streets.\* Preston S. Millar. (42) July.
- Clean-Up Work after Erecting Three 600-Ft. Radio Towers. (13) July 1.
- The C. T. S. I. Concentric System of Wiring.\* Donald Smeaton Munro. (73) July 2.
- Practical Construction of the Circle Diagram.\* G. H. Eardley-Wilmot. (73) July 2.
- Radio Frequency Changers.\* Alfred N. Goldsmith. (Paper read before the Inst. of Radio Engrs.) (73) Serial beginning July 2.
- On an Unbroken Alternating Current for Cable Telegraphy.\* G. O. Squier. (Abstract of paper read before the Physical Soc.) (73) July 2.
- Linking Up the London Electric Supply Stations.\* (12) July 2.
- The How and Why of the V-Type Motor.\* John S. Harwhite. (46) July 3.
- Life-Testing Equipment for Tungsten Lamps.\* (27) July 3.
- Power Plant of the Granby Co.\* Thomas Wilson. (64) July 6.
- Comparison of Electric Light and Power Rates.\* Judson C. Dickerman. (64) July 6.
- The Supply of Electricity for Small South African Towns.\* H. Bohle. (Paper read before the South African Inst. of Elec. Engrs.) (73) July 9.
- The Power Plant of the New Equitable Building.\* (27) July 10.
- Construction of the Transcontinental Telephone Line. D. P. Fullerton. (111) July 10.
- Savage Manufacturing Co.'s Power Plant, Savage, Md.\* W. O. Rogers. (64) July 13.
- Power Production. H. C. Widlake. (66) Serial beginning July 13.
- Steel-Tower Transmission-Line Construction.\* A. B. Cudebec. (27) July 17.
- Stassano Electric Furnace at Redondo.\* W. M. McKnight. (Paper read before the National Elec. Light Assoc.) (111) July 17.
- Rewinding Direct Current Motors and Generators.\* A. A. Fredericks. (64) Serial beginning July 20.
- Ornamental Street-Lighting Systems Compared.\* H. E. Mahan and H. E. Butler. (27) July 24.
- Central-Station Gains. (27) July 24.
- Coquitlam-Buntzen Hydroelectric Development. (27) July 24.
- L'Enlèvement des Matières en Suspension dans les Gaz au Moyen de l'Electricité. F. G. Cottrell. (93) Dec., 1914.
- L'Electricité Agent de Sonorité dans les Instruments à Cordes.\* H. Bévierre. (32) July.
- Ueberspannungen beim Abschalten von Asynchronmotoren. Reinhold Rüdenberg. (41) Apr. 15.
- Die drahtlose Station des Eiffelturmes.\* (41) Apr. 15.
- Beeinflussung von Schwachstromleitungen durch Wechselstrombahnen. (41) Apr. 22.
- Anordnung der Dämpferstäbe bei elektrischen Maschinen.\* Karl Schmidt. (41) Apr. 22.
- Maschinen—oder Mehrfachtelegraphen? Otto Arendt. (41) Serial beginning Apr. 22.
- Die Verwendung von Eisenleitungen als Ersatz von Kupfer-bzw. Aluminiumleitungen.\* Fr. W. Esch. (41) Apr. 22.
- Ueber die Messung und Auszeichnung elektrischer Glühlampen.\* Ernst Salomon. (41) May 6.
- Die Dimensionen der elektrischen Masseinheiten. H. Maurer. (41) May 13.
- Geschlossene Elektromotoren.\* Alfred Seyferth. (48) May 15.
- Schutz der Vögel gegen Starkstromleitungen.\* R. v. Erhardt. (41) May 20.
- Messungen über die Form der Stirn von Wanderwellen.\* Ludwig Binder. (41) Serial beginning May 20.
- Elektrische Taschenlampen.\* (41) May 27.
- Einfaches Diagramm des Drehstrom-Spannungswandlers.\* H. Gewecke. (41) May 27.
- Diagramm des Stromtransformators.\* H. G. Nolan. (41) June 3.
- Bogenlampe und Halbwattlampe. A. Chevalier. (41) June 3.
- Zum Einfluss der Porosität auf die Kapazität von Sammlerplatten. C. Helm. (41) June 10.
- Die günstigste Polform bei Hochfrequenzmaschinen.\* Karl Schmidt. (41) June 10.
- Drahtlose Telegraphie und Telephonie; Senderversuche mit niedrigen wagerechten Antennen. H. Brand. (41) June 10.

\* Illustrated.





**Electrical—(Continued).**

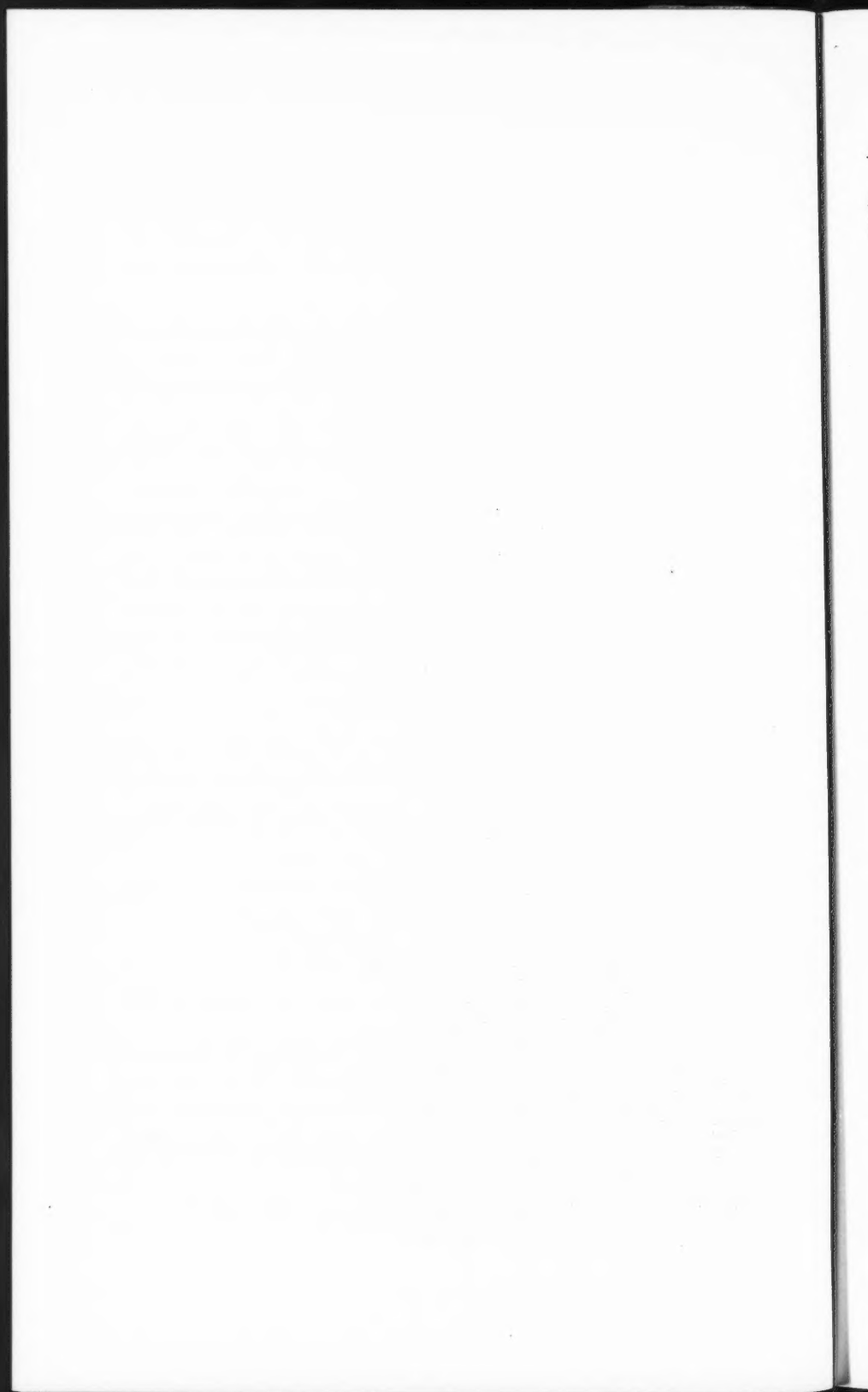
- Phasenkompensator mit Nebenschlusserregung.\* A. Scherbius. (41) June 17.  
 Fragen einheitlicher Bauweise von Pupinleitungen.\* F. Breisig. (41) June 17.  
 Die Berechnung von Drosselspulen auf geringste Kosten. Arle Ytterberg. (41)  
 Serial beginning June 24.  
 Bemerkungen zum Elektrizitätsgesetz-Entwurf. Hans C. Zimmermann. (53)  
 Serial beginning July 2.

**Marine.**

- The Portuguese Torpedo-Boat Destroyer *Douro*. (12) Apr. 23.  
 Geared Marine Steam Turbines. J. Hamilton Gibson. (From paper read before the  
 Foreman's Mutual Benefit Soc.) (12) Apr. 30; (47) Apr. 30.  
 Main-Motor Starting Switchgear Used on Modern German Submarines.\* Norman H.  
 Wood. (26) May 28.  
 Experiences Gained from Reinforced Concrete Barges Built for the Panama Canal.\*  
 W. Rowland. (14) May 29.  
 Freight Carrying on the Great Lakes.\* Day Allan Willey. (19) June 5.  
 The Prismatic Compass.\* (From *The Illustrated War News*.) (19) June 5.  
 Modern Submarine Torpedo Boats of the United States and Other Navies.\* Herbert  
 S. Howard. (13) June 24.  
 The French Laubeuf Submarine Boats.\* (11) July 9.  
 La Catastrophe du Paquebot *Lusitania* coulé par un Sous-Marin allemand.\*  
 E. Bertin. (33) May 15.  
 Note sur la Marche en Plongée des Sous-Marins.\* M. Zack. (33) June 5.  
 Le Paquebot *Transylvania* à Turbines et à Engrenages Retardateurs.\* (33)  
 June 12.  
 Le Pétrolier à Moteur Diesel et à Helice Réversible, *Poseidon*.\* F. Hofer. (33)  
 June 26.  
 Oscillateur pour Signaux Acoustiques Sous-Marins, Système Fessenden.\* (33)  
 June 26.  
 Systematische Modellversuche für Schlepper mit Gegenpropellern von Dr. Wagner.\*  
 Schaffran. (48) Apr. 24.  
 Elektrischer Schraubenantrieb auf einem amerikanischen Kriegsschiff.\* Schmelz.  
 (41) June 24.  
 Das Forschungsschiff *Albatros* für die Zoologische Station in Rovigno.\* W. Laas.  
 (48) June 26.  
 Das Zweischrauben-Motorschiff *Secundus*.\* (48) July 25.

**Mechanical.**

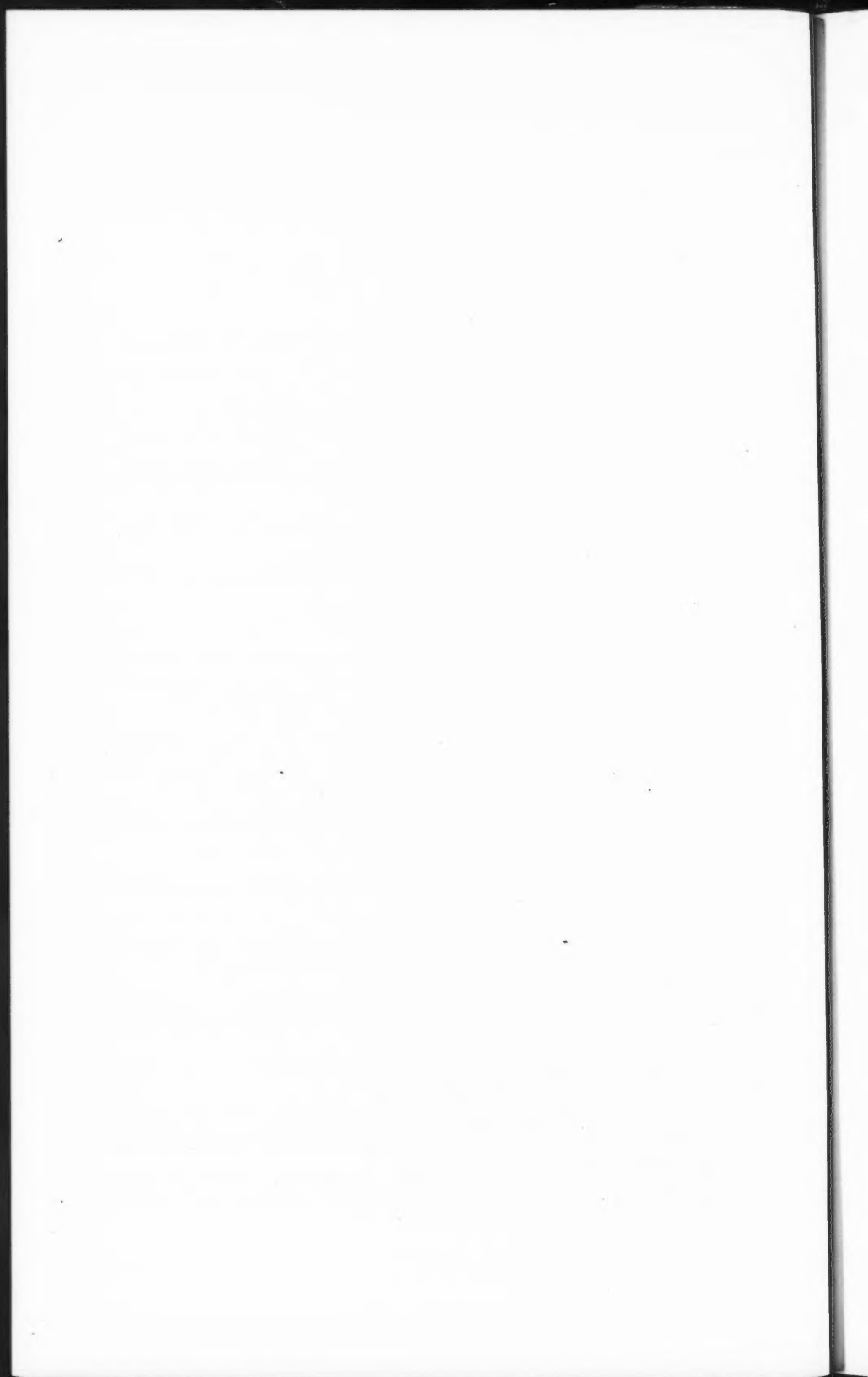
- The Discharge of Steam Through Nozzles.\* Wm. E. Fisher. (75) Oct., 1914.  
 The Theory of the Flow of Gases Through Nozzles.\* J. G. Stewart. (75) Oct., 1914.  
 Jigs and Fixtures.\* H. J. Thompson. (75) Oct., 1914.  
 Reports of the Refrigeration Research Committee of the Institution of Mechanical  
 Engineers.\* (75) Oct., 1914.  
 The Effect of Vacuum in Steam-Turbines.\* G. Gerald Stoney. (75) Oct., 1914.  
 Tests on a Recent Type of Chain Grate Stoker and New Method of Baffling Stirling  
 Boilers.\* John A. Hunter. (58) Feb.  
 Ohio Milling Machine.\* (108) Mar.  
 A Problem of the Modern City. W. F. M. Goss. (58) Mar.  
 The Rands Gravity Sand Plant.\* (15) Mar. 19.  
 The Electric Furnace for Reheating, Heat Treating and Annealing. T. F. Bailly.  
 (58) Apr.  
 A Turbine-Driven Reciprocating Air-Compressor.\* (22) Apr. 23.  
 Belt Driving.\* N. T. Millar. (12) Serial beginning Apr. 23.  
 Foreign Trade in Bookbinders' Machinery. (12) Apr. 23.  
 A New Type of Stone Dust Grinding Plant.\* (57) Apr. 23.  
 The Distillation of Mond Gas Tar.\* (22) Apr. 23.  
 Gas-Fired Industrial Furnaces.\* (11) Apr. 23.  
 Modern Ironfounding.\* R. Onions. (Paper read before the Manchester Asso-  
 ciation of Engineers.) (12) Apr. 23.  
 The Blackstone Oil Engine.\* (12) Apr. 23.  
 The Products of Coal Distillation. W. J. A. Butterfield. (66) Apr. 27.  
 Coke-Oven Bye-Products. Thomas G. Watts. (Paper read before the Cardiff Con-  
 ference on the Extension of British Trade.) (66) Apr. 27.  
 Fractional Collection of Crude Tar. George Thomson Purves. (Paper read before  
 the Soc. of Chemical Industry.) (66) Apr. 27.  
 Dehydration of Water-Gas Tar at the Amsterdam Western Gas-Works. (66)  
 Apr. 27.  
 The Processes of Manufacture of Wrought-Iron and Steel Tubes.\* J. G. Stewart.  
 (Abstract of paper read before the Institution of Engrs. and Shipbuilders in  
 Scotland.) (22) Apr. 30.  
 Rastrick Boiler Explosion at Dewsbury.\* (47) Apr. 30.  
 45-Cwt. Motor Lorry.\* (12) Apr. 30.  
 The Utilisation of Solar Energy.\* A. S. E. Ackerman. (29) Apr. 30.



**Mechanical—(Continued).**

- Improvements in Pneumatic Hammers.\* (47) Apr. 30.  
 Oil Firing in Foundry Practice. W. N. Best. (Paper read before the Newark Foundrymen's Association.) (47) Apr. 30.  
 Fuel Feed Device for Oil Engines.\* (47) Apr. 30.  
 Accidents from Cranes: Their Cause and Prevention. (47) Apr. 30.  
 Feed-Water Regulator for Steam Boilers.\* (47) Apr. 30.  
 Direct-Current Control for Hoisting Equipment in Industrial Plants.\* W. T. Snyder. (42) May.  
 Pulverized Fuel for Locomotives.\* (25) May.  
 Gas Producers with By-Product Recovery.\* Arthur H. Lymn. (55) May.  
 The Reburning of Lime from Alkali Waste and Other Forms of Precipitated Carbonate of Lime.\* Richard K. Meade. (105) May.  
 Making Ice with Purchased Electric Power.\* Charles A. Tripp. (Paper read before the Indiana Eng. Soc.) (60) May.  
 Blast Furnace Gas in Steam Production.\* S. M. Marshall. (62) May 1.  
 Industrial Uses of Fuel Oil. F. B. Dunn. (111) Serial beginning May 1.  
 The Peterson Power Plant Oil Filter.\* (64) May 4.  
 Ratio of Circumferential to Longitudinal Stresses in Boiler Joints.\* J. K. Linderhurst. (64) May 4.  
 The Recovery and Fractionation of Benjol from Coal Gas. W. Diamond. (Paper read before the North of England Gas Managers Assoc.) (66) May 4.  
 Steam-Turbine Diagrams.\* F. R. Low. (64) May 4.  
 Air Compressor Valve of Steel Strips.\* (20) May 6.  
 Graphic Method of Estimating Core Costs.\* Edward S. Dean. (20) May 6.  
 Congestion in Foundries. H. M. Lane. (20) May 6.  
 A Bearing Metal of High Elastic Limit. (20) May 6.  
 Gray-Iron Foundry of Instructive Design.\* (20) May 6.  
 Motor Vehicles in Water-Works Service at Los Angeles, Calif. Burt A. Heinly. (13) May 6.  
 New Heat-Insulating Material (Fibrox). (13) May 6.  
 Cambria Steel Company's New Bar Mill.\* (20) May 6.  
 Adjustable-Spindle Boring Machine.\* (20) May 6.  
 A 100-In. Driving Wheel Lathe.\* (20) May 6.  
 The Ovens and Recovery Plant of the Team By-Product Coke Company, Limited.\* Frederick C. Coleman. (57) May 7.  
 On the Measurement of the Efficiency of Domestic Fires, and on a Simple and Smokeless Grate.\* Augustus Vernon Harcourt. (29) May 7.  
 New Plant of the Team By-Product Coke Company.\* (22) May 7.  
 American Air Compressors for Testing Torpedoes.\* (12) May 7.  
 Development of Motor Design.\* Frederick Strickland. (11) Serial beginning May 7.  
 Plug and Spindle Leakage. (11) May 7.  
 Efficient Lighting for Industrial Workers.\* Fred Schwarze. (101) May 7.  
 The Formation of Clinker in Coal. S. U. Tislin. (27) May 8.  
 The Gas-Filled Lamps in Photography. W. Voegel. (27) May 8.  
 Experience with a By-Product Coke Oven Plant.\* C. C. Boardman. (Paper read before the Illinois Gas Assoc.) (24) May 10.  
 Removal of Carbon Bisulphide from Gas. (From *Het Gas.*) (66) May 11.  
 Inclined Retorts at Decatur (U. S. A.). (66) May 11.  
 Ebbw Vale Bye-Product Coking Plant. (66) May 11.  
 Steam Turbines: Their Principles and Operation.\* Charles H. Bromley. (64) May 11.  
 Steam-Generating Methods, Cleveland Municipal Plant.\* A. D. Williams. (64) May 11.  
 Graphic Representations of Power Plant Losses.\* E. D. Dreyfus. (64) May 11.  
 What Causes the High Efficiency of Locomotives? E. R. Pearce. (64) May 11.  
 Chamber Ovens at Seattle (U. S. A.). W. A. Miller. (66) May 11.  
 Liquid Fuel for Foundry Cupolas. (20) May 13.  
 Internal Combustion Drier for Molds.\* (20) May 13.  
 Failure of Panama Crane *Ajax*.\* F. H. Cooke. (13) May 13; (62) June 15.  
 The Jitney Bus. C. I. Palm. (Abstract from paper read before the Iowa Street and Interurban Ry. Assoc.) (13) May 13.  
 The Panama Crane Contract.\* F. H. Cooke. (13) May 13.  
 Self-Contained Power Plant.\* (20) May 13.  
 Heavy Cutting-Off Machine.\* (20) May 13.  
 Workmen's Co-Operation Reduces Accidents. (20) May 13.  
 Reclaiming Brass Sweepings. A. W. Lemme. (Paper read before the Chicago Foundrymen's Club.) (47) May 14.  
 Recent Progress in Pyrometry. Charles R. Darling. (29) May 14.  
 Telfers Expedite Coal Movement at German Plant.\* Alfred Gradenwitz. (14) May 15.  
 Danger of Welding Process as Applied to Tires and Wheels.\* Morgan D. Hayes. (17) May 15.

\* Illustrated.



**Mechanical—(Continued).**

- Portable Refrigerating Plant for Mining Camps.\* (82) May 15.  
 A Unique Central Heating Plant.\* Otto B. Goldman. (111) May 15.  
 Essentials of Modern Gas Composition. William Cranfield. (Paper read before the Scottish Junior Gas Assoc.) (24) May 17.  
 The Why's of Boiler Draft.\* C. F. Hirshfield. (64) May 18.  
 Boiler Plant of Union Brewery.\* Thomas Wilson. (64) May 18.  
 Coke v. Welsh Coal for Steam-Raising. (66) May 18.  
 Internal-Combustion Engine Dimensions.\* H. L. Watson. (64) May 18.  
 Imperial College of Science and Technology: Demonstration of the Equipment in the Fuel Laboratories of the Chemical Technology Department.\* (66) May 18.  
 Exhaust Steam for Making Water Gas. G. A. Reinhard and C. A. Schnerr. (Paper read before the Illinois Gas Association.) (66) May 18.  
 Miter Cutting Machine for Steel Shapes.\* (20) May 20.  
 Making Sprocket Chain without Waste.\* (20) May 20.  
 Improvement in By-Product Foundry Coke. C. S. Lomax. (Paper read before the Pittsburgh Foundrymen's Association.) (20) May 20.  
 Pneumatic Sifter for Molding Machines.\* (20) May 20.  
 Slabbing Machine with One-Pulley Drive.\* (20) May 20.  
 The Use of Tar as Fuel. (57) May 21.  
 Powdered Coal. W. L. Robinson. (Paper read before the International Railway Fuel Association.) (15) May 21; (18) June 5; (25) June; (47) July 9; (45) July.  
 A Casting Process for Producing Rods.\* (47) May 21.  
 Overcoming Difficulties in Steel Foundry Practice.\* G. Muntz and S. Roubieu. (From *Steel Castings*.) (47) May 21.  
 Morison's Surface Condensers.\* (47) May 21.  
 Smoke Prevention. E. W. Pratt. (Paper read before the International Railway Fuel Association.) (15) May 21.  
 Exhaust Fan Ratings and Pipe Diameters. (101) May 21.  
 The Unaccounted-for Loss. S. U. Tuspín. (27) May 22.  
 Fuel Stations.\* (Report of the Internat. Ry. Fuel Assoc.) (18) May 22; (25) June.  
 Waste-Heat Boilers at Chrome. N. J.\* Clarence L. Brower. (16) May 22.  
 Toluene Recovery Plant at Beckton, England.\* (24) May 24.  
 Residence Lighting with Special Reference to Semi-Direct Illumination. R. F. Pierce. (Paper read before the Pennsylvania Gas Association.) (24) May 24.  
 The Internal Combustion Turbine.\* (24) May 24.  
 Cold-Air Intake Duct for Air Compressors. R. S. Bayard. (64) May 25.  
 Manufacture of Concentrated Gas Liquor. R. W. Hilgenstock. (From *Journal für Gasbeleuchtung*.) (66) May 25.  
 Initial and Operating Costs of Refrigerating Plants. Robert P. Kehoe. (64) May 25.  
 Lining Up Small Turbine Sets.\* J. H. Hurley. (64) May 25.  
 Uniformity in Gas Companies' Balance Sheets. (66) May 25.  
 Thermal Conductivity of Refractory Materials.\* G. Dougill, H. J. Hodsmán and J. W. Cobb. (Paper read before the Society of Chemical Industry.) (66) May 25; (22) June 25.  
 Testing and Repairing Pyrometers.\* (64) May 25.  
 A New Machine for Making and Sharpening Rock Drill Bits.\* (86) May 26.  
 A Novel Molding Machine.\* (20) May 27.  
 The Morgan Producer Gas Machine.\* (20) May 27.  
 Pattern-Making in a Small Shop.\* (72) May 27.  
 Light Tractors for Industrial Service.\* (13) May 27.  
 New System for Burning Powdered Coal in Metallurgical Furnaces.\* C. F. Herington. (13) May 27.  
 Milling Chasers for Thread-Cutting Machines.\* Ethan Viall. (72) May 27.  
 Spring Forming and Hardening Machine.\* (20) May 27.  
 Ball-Pointed Measuring Tools.\* William S. Rowell. (72) May 27.  
 Machining a Slide for a Shoe Machine.\* (72) May 27.  
 Toggle Press with Dwelling Blankholder.\* (20) May 27.  
 Toggle Drawing Press.\* (72) May 27.  
 Making Pumps for Oil Wells.\* S. E. Banneck. (72) May 27.  
 Some J. & L. Fixtures for Making Knitting-Machine Parts.\* Robert Mawson. (72) May 27.  
 Obtaining Data from Wornout Bevel Gears.\* J. C. O'Brien. (72) May 27.  
 Cost System of Michigan Sheet Metal Shop.\* (101) May 28.  
 The Gas Turbine. Sydney F. Walker. (73) May 28.  
 Device for Carburetting Air and Admitting It to the Cylinders of Oil Engines.\* (47) May 28.  
 Heavy Motor Vehicles, Wheels and Weights.\* W. Worley Beaumont. (12) May 28.  
 A New Coke Fired Road Vehicle.\* (12) May 28.

\* Illustrated.



**Mechanical—(Continued).**

- A Mercury-Vapor Engine.\* (46) May 29.  
 Pipe-Threading Machines for Mine Service.\* George E. Edwards. (82) May 29.  
 The Gas Water Heater.\* (24) May 31.  
 Centrifugal Dehydration of Water Gas Tar at Amsterdam. (24) May 31.  
 Modern Electric Elevator and Elevator Problems.\* David Lindquist. (55) June.  
 Ice-Making as a By-Product of Central Stations.\* Heywood Cochran. (55) June.  
 Lubricating Oil Tests. R. C. Merchant. (Abstract of paper read before the Chemical Society, Northeastern Pennsylvania.) (45) June.  
 Commercial Value of Exhaust Steam.\* A. Langstaff Johnston, Jr. (9) June.  
 Oxy-Acetylene Process for Boiler Work. Frank McManamy. (Paper read before the Master Boiler Makers' Assoc.) (25) June; (15) June 4.  
 An Important Advance in Gas Producer Efficiency.\* (105) June.  
 Fuel-Supply Contracts and the Progress of More Scientific Methods of Purchase and Control in America and Europe. John B. C. Kershaw. (105) June.  
 The Action of Certain Colloids on Ions During Electrolysis.\* (105) June.  
 The Time Factor in Making Oil Gas. M. C. Whitaker and C. M. Alexander. (83) June 1.  
 Most Economical Vacuum for Steam Turbines.\* (64) June 1.  
 Dimensions, Weights and Costs of Steam Turbines. A. A. Potter and S. L. Simmering. (64) June 1.  
 Factory Lighting by High Pressure Gas. (From paper read before the Eastern Counties Association.) A. E. Broadberry. (66) June 1.  
 Gas-Heated Furnaces for Industrial Purposes.\* E. P. Taudevin. (66) June 1.  
 Some Notes on Elevator Pumps.\* Thomas J. Rogers. (64) June 1.  
 Waste-Heat Boilers for P. H. Furnaces.\* C. J. Bacon. (Paper read before the Am. Iron and Steel Inst.) (62) June 1; (20) June 17.  
 Development of Merchant Rolling Mills. Jerome R. George. (Paper read before the Am. Iron and Steel Inst.) (62) June 1; (20) June 10.  
 Requirements of Aeroplane and Automobile Motors. (72) June 3.  
 Making Aluminum Automobile Bodies.\* (20) June 3.  
 Some Useful Types of Handwheel-Operated Jigs.\* Robert Mawson. (72) June 3.  
 Quick-Closing Door for Pressure Cylinders.\* (13) June 3.  
 New Hammer Bolt Heading Machine.\* (20) June 3.  
 Gear Generator Tool Grinding Machine.\* (20) June 3.  
 Dock Variable-Speed Transmission on a Planer.\* (72) June 3.  
 Cartridge Heading Presses and Accumulators at the Angus Shops.\* (72) June 3.  
 Miscellaneous Paints Used in Machine Shops. E. H. Fish. (72) June 3.  
 How to Organize a Night Force. Harold C. White. (72) June 3.  
 A Simple and Effective Routing System.\* (72) June 3.  
 Formula for Pitch-Line Thicknesses of Bevel-Gear Teeth.\* George W. Felton. (72) June 3.  
 A Four-Part Factory Inventory System.\* H. A. Russell. (20) June 3.  
 The Creeping Grip Tractor.\* (12) June 4.  
 The Lyman Producer-Gas and Ammonia-Recovery Plant.\* (11) June 4.  
 Apparatus for Testing the Fuel Consumption of Oil Engines.\* (47) June 4.  
 The Rise of the Automobile.\* (46) June 5.  
 Dragline Cableway is an Effective Tool for Sand and Gravel Plants.\* W. H. Wilms. (14) June 5.  
 Scientific Aeronautic Research.\* J. C. Hunsaker. (From *Science Conspectus*.) (19) June 5.  
 Inconspicuous Losses in Refrigerating Plants. Peter Neff. (64) June 8.  
 Horsepower Constants for G. E. Type F Steam-Flow Meter. Hubert E. Collins. (64) June 8.  
 Phenix Oil and Graphite Cylinder Lubricator.\* (64) June 8.  
 Tests on the Diagonal Strength of Boiler Plate. J. W. F. Macdonald. (64) June 8.  
 Methods and Cost of Pneumatic Calking of Lead Wool Joints in Large Gas Mains in Chicago. C. E. Reinicker. (Paper read before the Illinois Gas Assoc.) (86) June 9.  
 The Dennis Subsidy Lorry.\* (12) Serial beginning June 11.  
 The Undercooling of Steam in Nozzles.\* (11) June 11.  
 The 250-Ton Floating Cranes for the Panama Canal.\* (11) June 11.  
 Briquets as Fuel for House Heating Boilers.\* D. T. Randall. (101) June 11.  
 Hoist on Revolving Headframe Operates Dragline.\* (14) June 12.  
 New Carbonizing Plant at Yeadon (Yorks).\* (66) June 15.  
 Oxyacetylene Welding in Pipe Work.\* W. Lee Roneche. (64) June 15.  
 Heavy Truck and Rigging Used to Install 48-Ton Armatures.\* (14) June 15.  
 Some Notes on the Cooling of Condensing Water.\* C. S. Jeffrey. (77) June 15.  
 New Forge Shop of Upson Nut Company.\* (20) June 17.  
 New 150-Ton Revolving Floating Crane for Norfolk.\* A. F. Case. (13) June 17.  
 The Use of Electric Vehicles in Municipal Service.\* F. Ayton. (Abstract of paper read before the I. M. E. A. Assoc.) (73) June 18; (47) July 9.

\* Illustrated.



A

M

I

T

L

A

C

**Mechanical—(Continued).**

- Drop Forgings. Arthur Stubbs. (Abstract of paper read before the Institution of Automobile Engrs.) (47) June 18.
- The Storage of Coal. G. G. Bell. (73) June 18.
- Recent Progress of the Electric Vehicle.\* Raymond J. Mitchell. (73) June 18.
- Ticket-Printing Weighing-Machine.\* (11) June 18.
- Automobile Lubrication.\* C. W. Stratford. (Paper read before the Soc. of Automobile Engrs.) (19) Serial beginning June 19.
- Oil Burning Stand-By Plants.\* C. H. Delaney. (111) Serial beginning June 19.
- Fractional Collection of Crude Tar.\* G. T. Purves. (Paper read before the Soc. of Chemical Industry.) (24) June 21.
- The Automatic Operation of a Water Gas Set.\* C. F. Zeek. (Paper read before the Southern Gas Assoc.) (24) June 21; (83) June 15.
- Pumping Station Equipment at Toronto.\* (96) June 24.
- The Testing of Air Compressors.\* C. E. Davies. (12) June 25.
- The Southwark-Harris Diesel Engine.\* (64) June 29.
- Firebrick for Boiler Settings. William A. Heisel. (Paper read before the Ohio Soc. of Mech., Elec. and Steam Engrs.) (64) June 29.
- Some Engineering Problems Arising in the Transportation of Natural Gas.\* Jas. P. Fisher. (56) July.
- A Rational Basis of Comparison of the Duties of Electrical Elevators and Hoisting Engines. Andrew M. Coyle. (55) July.
- Mechanical Draft and the Evasé Stacks.\* A. M. de Bellis. (9) July.
- Welding Copper and Copper Alloys by Acetylene Methods. J. F. Springer. (25) July.
- The Cost of Compressed Air. Thomas F. Crawford. (25) July.
- Coal Loading Plant at Workington Harbour.\* (12) July 2.
- Notes on Feed Check Valves and Internal Feed Pipes.\* J. R. Edwards. (From *Vulcan*.) (47) July 2.
- Messrs. Fraser and White's Coal-Handling Plant at Portsmouth.\* (11) July 2.
- Vapour-Compression Refrigeration.\* John H. Grindley. (Paper read before the Institution of Civ. Engrs. of Ireland.) (11) Serial beginning July 2.
- Haulage by Mechanical Means. T. W. E. Higgins. (Paper read before the Inst. of Municipal and County Engrs.) (104) July 2.
- Mechanical Traction for Municipal Work. Ernest J. Elford. (Paper read before the Inst. of Mun. and County Engrs.) (104) July 2.
- Analysis of Dependent Sequence as a Guide to Fuel Economy. Harrington Emerson. (Paper read before the Internat. Ry. Fuel Assoc.) (18) July 3; (25) June; (15) May 21.
- The Composition of Gas in Relation to the Performance of the Bunsen Burner.\* Robert French Pierce. (24) July 5.
- The New Gas-Works at Budapest.\* M. Isidor Bernauer. (Translation of abstract from the *Journal für Gasbeleuchtung*.) (66) Serial beginning July 6.
- New Iron Mill Equipped to Assure Low Costs.\* O. J. Abell. (20) July 8.
- The Electric Vehicle and the Central Station. J. F. Gilchrist and A. J. Marshall. (73) Serial beginning July 9.
- Self-Propelled Low-Clearance Shovelling-Machine.\* (11) July 9.
- Motor Fuels. Vivian B. Lewes. (29) Serial beginning July 9.
- Anaconda Coal-Pulverizing Plant.\* E. P. Mathewson. (16) July 10.
- Old Storage Used for Oversize in Enlarged Rock-Crushing Plant on Detroit River.\* (14) July 10.
- Garbage Collection Studies in Chicago Justify Continued Use of Horses.\* (14) July 10.
- The Improved Jones Oil Gas Process at the Patrero Gas Works, San Francisco.\* E. C. and L. B. Jones. (24) July 12.
- Efficient Structural Shop Production.\* Charles C. Lynde. (62) July 15.
- Seventy-Nine-Ton Derrick Car Lowers Itself 50 Feet in Twenty-Five Minutes.\* A. S. Beale. (14) July 17.
- Motor Trucks for Heavy Structural Steel.\* William Collins, Jr. (13) July 22.
- Wagon Loaders for Broken Stone.\* (13) July 22.
- Ammonia a Heat Vehicle. Albert Johnson. (Paper read before the Am. Meat Packers' Assoc.) (19) July 24.
- Formulas for Glass Manufacture. (From *Nature*.) (19) July 24.
- Increasing Business with Electric Trucks.\* (27) July 24.
- Les Funiculaires Aériens pour Voyageurs.\* A. Lévy-Lambert. (32) July, 1914.
- L'Hydrogénation des Huiles et Corps Gras.\* George-F. Jaubert. (32) July, 1914.
- Adaptation du Moteur à Explosion au Labourage du Sol; Compte Rendu de Quelques Récentes Manifestations de Motoculture.\* L. Ventou-Duclaux. (32) July, 1914.
- La Lutte Contre les Poussières dans les Fabriques de Ciment Portland, au Moyen du Procédé de Précipitation Electrique de Cottrell.\* Walker A. Schmidt. (93) Dec., 1914.
- Le Tarage des Machines d'Essais.\* P. Breull. (93) Mar.
- Manutention Mécanique du Charbon et des Cendres de l'Usine Electrique de Hackney près de Londres.\* (33) May 1.

\* Illustrated.

A

M

L

L

R

L

I

U

U

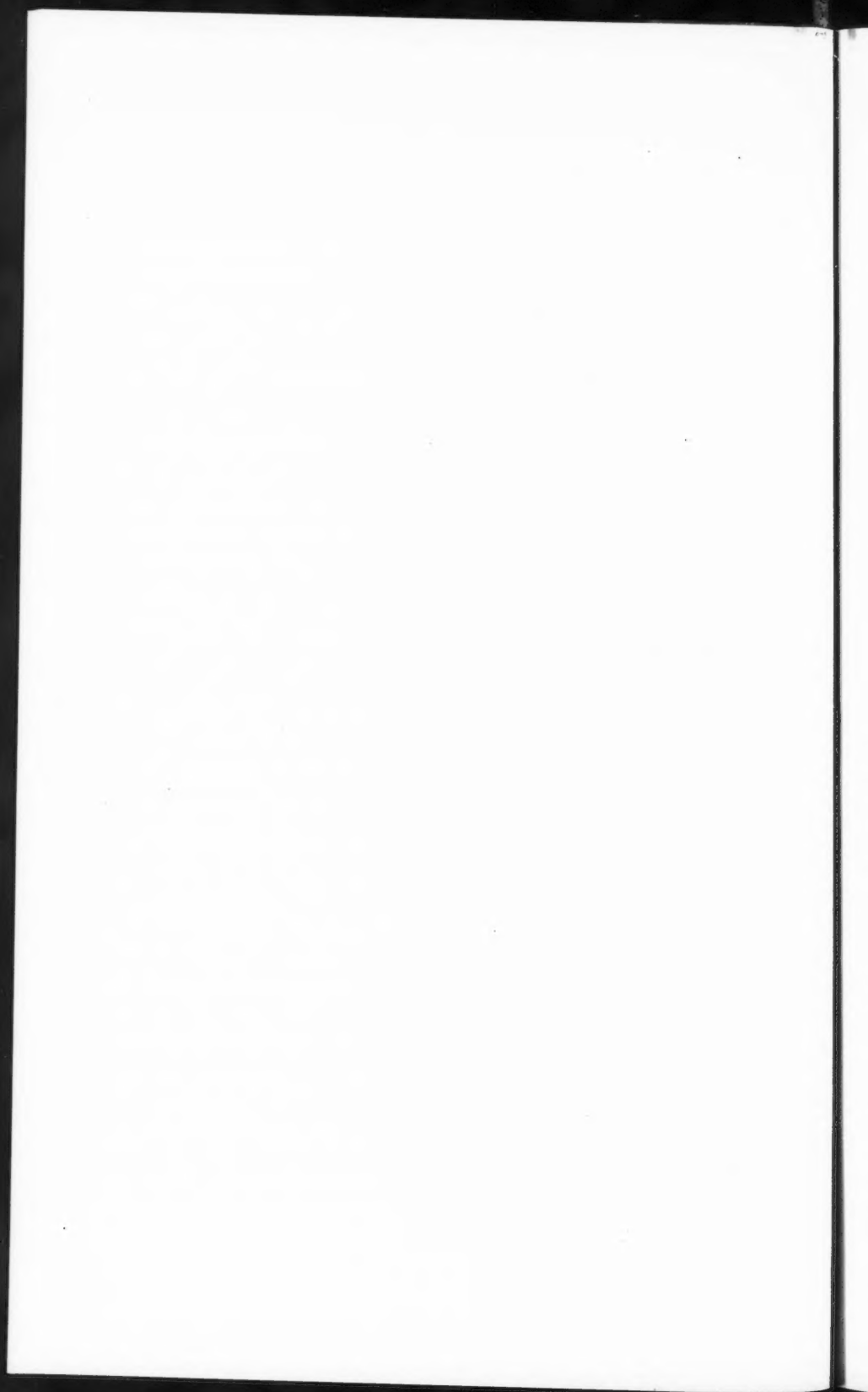
**Mechanical—(Continued).**

- Les Dirigeables Zeppelin et leur Rôle dans la Guerre Actuelle.\* (33) May 22.  
 La Résolution de l'Equation de Traction d'un Véhicule en Mouvement par le Puissance-Mètre.\* J. Carlier. (33) June 12.  
 Réparation d'une Grue Flottante de 250 Tonnes du Canal de Panama, Rompue Pendant les Essais.\* (33) July 10.  
 La Fabrication d'Essence Minérale pour Moteur par Décomposition Pyrogénée des Huiles Lourdes de Pétrole (cracking); Procédé Hall. Alexandre Delisle. (33) July 10.  
 Der Bau von Dieselmotoren in den Vereinigten Staaten von Amerika. Schrauff. (48) July 25.  
 Ueber die Erfindung und Entwicklung der Seilschwebbahnen.\* Georg Chr. Mehrrens. (69) Serial beginning Dec., 1914.  
 Ueber die Berechnung der an Kugel- und Rollenlagern auftretenden Materialspannungen (Berichtigung der H. Hertzschen Gleichungen).\* E. Rasch. (69) Jan.  
 Roheisenmischer-Gebäude der Phönix A.-G. für Bergbau und Hüttenbetrieb, Abt. Hörder Verein.\* Franz Czech. (69) Jan.  
 Versorgung der Kohlenlager auf Bahnhöfen.\* Haasler. (102) Feb. 1.  
 Einfacher Nachweis brennbarer Gase in Verbrennungsgasen. A. Dosch. (7) Mar. 13.  
 Vorschläge zur rechnerischen Bestimmung des Heisswalzprozesses.\* Emil Kircheng. (50) Apr. 22.  
 Ueber den Kraftbedarf von Kondensationsanlagen.\* G. Klingenberg. (41) Apr. 29.  
 Die Eisen- und Metallgießereien der Firma Gebrüder Sulzer, Aktiengesellschaft, Ludwigshafen am Rhein.\* (50) Apr. 29.  
 Bemerkenswerte Betonfundierungen im Hüttenbetrieb.\* Schömburg. (78) May 3.  
 Vorschläge zur Berechnung von Schutzbrücken für Drahtseilschwebbahnen.\* A. Senft. (40) May 5.  
 Theoretische und praktische Ermittlung von Koksofen-Wärmebilanzen.\* Hugo Krueger. (50) May 6.  
 Die spezifische Wärme c/p des überhitzten Wasserdampfes für Drücke von 8 bis 20 at und von Sättigungstemperatur bis 380° C.\* Osc. Knoblauch und Alexander Winkhaus. (48) Serial beginning May 8.  
 Ueber den Einfluss des Blockgewichtes und der Walzgeschwindigkeit auf den Kraftbedarf beim Walzen.\* J. Puppe und H. Monden. (50) Serial beginning May 13.  
 Die Bewegung des Fördergutes im Füllrumpf.\* Hans Wettich. (50) May 20.  
 Stapelelevatoren.\* Georg v. Hanffstengel. (48) May 22.  
 Die Dampfmaschinen und Dampfkessel an der Schweizerischen Landesausstellung Bern, 1914.\* P. Ostertag. (107) May 29.  
 Trio-Zweistich-Vorwalzwerk.\* Bruno Quast. (50) June 5.  
 Ueber den Schutz vor Oelschalterbränden durch neutrale Gase. Friedrich Münz. (41) June 10.  
 Neues Verfahren zur Bestimmung des Stickstoffs in Kohle und Koks.\* Oskar Simmersbach und Friedrich Sommer. (50) June 10.  
 Neuerungen in Kohlenstaubfeuerungen.\* (50) June 17.  
 Die neue Automobil-Ausstellungshalle am Kaiserdamm in Berlin.\* Hans Schmuckler. (51) June 19.  
 Die Kälte-Anlagen an der Schweiz. Landesausstellung Bern, 1914.\* P. Ostertag. (107) June 26.

**Metallurgical.**

- The Manufacture and Use of Pure Iron.\* Howard See. (Paper read before the Oregon Soc. of Engrs.) (1) Apr.  
 Reconstruction Work at the Pennsylvania Steel Company's Plant.\* Frank A. Robbins. (98) Apr.  
 Yields and Wastes, with Special Reference to Puddling. J. E. Fletcher. (Paper read before the Staffordshire Iron and Steel Institute.) (22) Apr. 23.  
 Modern Power Plants in the Iron Industry. J. E. Johnson. (47) Apr. 23; (105) June.  
 Tests of Natural Gas-Fired Brass Furnaces.\* Fred L. Wolf and Robert B. Burr. (Abstract of paper read before the American Institute of Metals.) (47) Apr. 23.  
 Heat Treatment of Steel.\* J. Herbert Parker. (Paper read before the National Machine Tool Builders' Association.) (47) Apr. 30.  
 Electric Iron-Ore Smelting in Norway.\* (11) Apr. 30.  
 A Case for Copper Hydrometallurgy.\* (105) May.  
 Modern Steels and Their Heat Treatment.\* Robert R. Abbott. (55) May.  
 Solution Control in Ferric-Chloride Leaching of Sulphide Copper Ores. F. N. Flynn and Roger H. Hatchett. (105) May.  
 Flotation in Gold Metallurgy. W. B. Blyth. (From paper read before the Aust. Inst. of Min. Engrs.) (105) May.

\* Illustrated.



**Metallurgical—(Continued).**

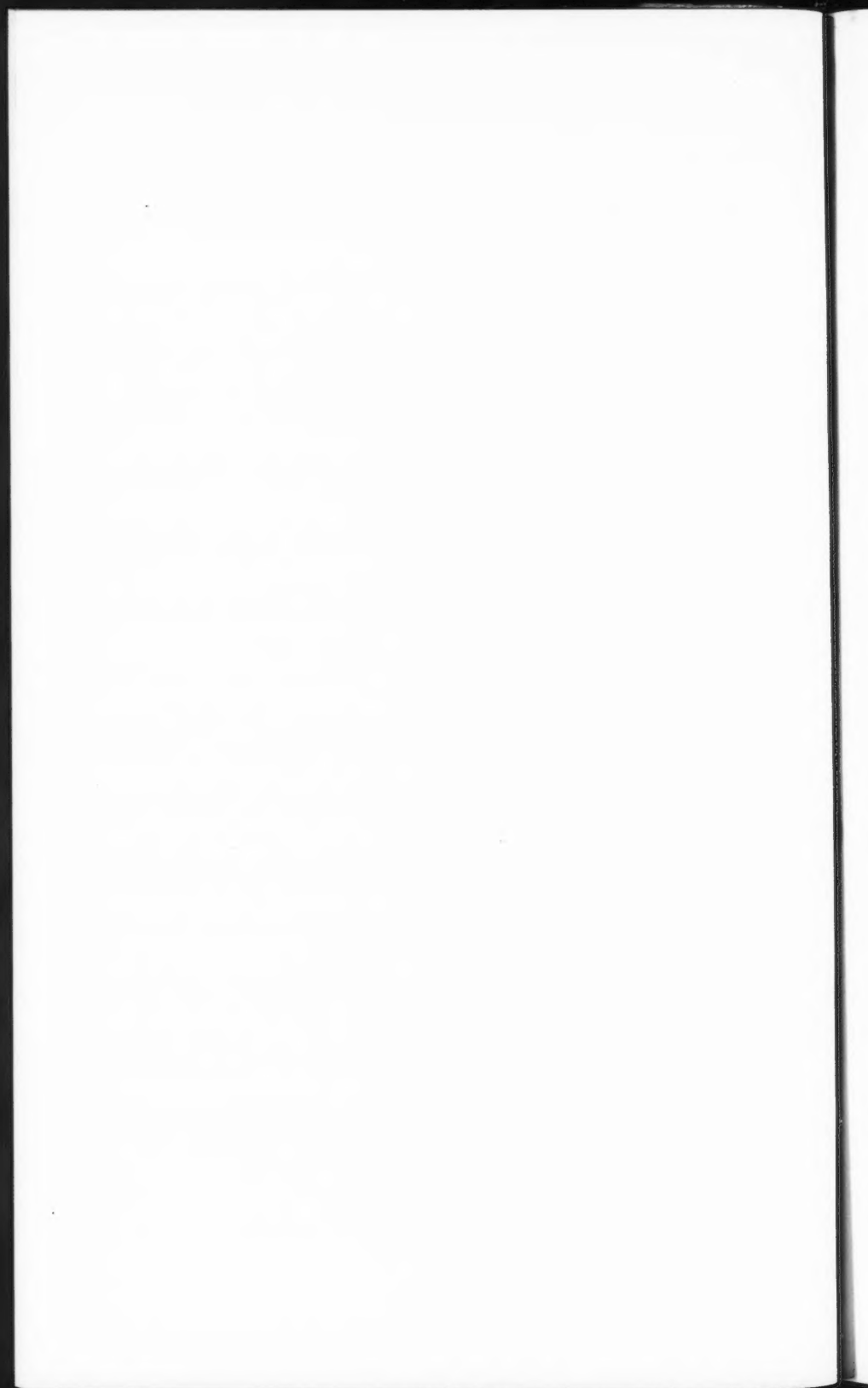
- Notes on the Reverberatory Furnace.\* Francis R. Pyne. (105) May.  
 Stock Rehabilitation for Alloy Output.\* Charles C. Lynde. (62) May 1.  
 The Flotation of Copper Ores. (103) May 1.  
 Cadmium in Brass. (47) May 7.  
 The Chilean Nitrate Industry.\* Mark R. Lamb. (16) May 8.  
 Cyanide Plant of the Chicksan Mines, Korea.\* Charles W. De Witt. (103) May 8.  
 Zinc Manufacture in the Pittsburgh District: The Plant of the American Zinc & Chemical Company at Langeloth, Pa.\* (20) May 13.  
 A Method for Determining Gases in Steel.\* P. Goerens and J. Paquet. (From *Ferrum.*) (20) May 13.  
 The Properties of Some Nickel-Aluminum and Copper-Nickel-Aluminum Alloys. A. A. Read and R. H. Greaves. (Abstract of paper read before the Institute of Metals.) (47) Serial beginning May 14.  
 Assay of Cyanide Solutions. C. E. Roodhouse. (103) May 15.  
 A Steel Plant in Southern California.\* (20) May 20.  
 Recovery of Flue-Dust Iron. (20) May 20.  
 The Conductivity of Metals.\* J. J. Thomson. (Paper read before the Inst. of Metals.) (11) May 21.  
 Molybdenite. (68) May 22.  
 German Iridium Steel. (96) May 27.  
 Flue Dust Sintering Plant at Gary.\* (20) May 27.  
 Recent Progress in Flotation. O. C. Ralston and F. Cameron. (16) May 29; (103) June 26.  
 The Metallurgy of Alluvial Mining.\* John M. Nicol. (103) Serial beginning May 29.  
 Secondary Sulphide Enrichment of Copper Ores. (103) May 29.  
 Fumeless Ore Furnace Burning Crude Oil. (82) May 29.  
 The Relative Efficiency of Various Amalgams in the Recovery of Gold. Francis A. Thomson and Robert Keffer. (105) June.  
 Is Duplexing Slated for Assassination? Joseph I. Peyton. (105) June.  
 Comparative Furnace Efficiency.\* R. J. Weitlaner. (105) June.  
 Electric Steel in Germany and Austria. (105) June.  
 Concentrating Plant of the Moose Mountain, Ltd.\* B. B. Hood. (16) June 5.  
 Wet Method of Mercury Extraction. (103) June 5.  
 The Shui-Kou-Shan Mine in Hunan, China.\* H. Y. Liang. (103) June 12.  
 The Commercial Production of Sound Steel.\* Edward F. Kenney. (Paper read before the Iron and Steel Inst.) (20) June 17; (62) July 1.  
 The Manufacture of Electric Steel in the Stobie Furnace. Victor Stobie. (Paper read before the Cleveland Institution of Engrs.) (12) June 18; (47) June 25.  
 New York & Honduras Rosario Mining Co. J. M. De Hart. (82) June 19.  
 Shaft-Rockhouse Practice in the Copper Country.\* L. Hall Goodwin. (16) Serial beginning June 19.  
 The Electric Furnace and the Melting of Alloys. R. S. Wile. (Abstract of paper read before the Soc. of Iron and Steel Elec. Engrs.) (47) June 25; (20) May 13.  
 Ore-Dressing Practice in the Wisconsin Field.\* Clarence A. Wright. (Abstract from *Technical Paper* 95, U. S. Bureau of Mines.) (82) Serial beginning June 26.  
 The Rainbow Mill, Oregon.\* W. M. Dake, Jr. (16) June 26.  
 Handling Ore at the Calumet & Arizona Smelter.\* C. A. Tupper. (82) July 3.  
 Flotation at the Inspiration Mine, Arizona.\* (103) July 3.  
 Flotation in Australia.\* Charles S. Galbraith. (103) July 17.  
 Solution of Pulp Problems by Graphic Methods.\* W. J. McCauley. (16) July 17.  
 Arizona Copper Co.'s Dour Thickener.\* David Cole. (16) July 24.  
 Memoires de la Métallographie.\* Henry Le Chatelier. (93) Jan.  
 Le Fer Electrolytique; sa Fabrication Industrielle; ses Propriétés; ses Emplois.\* L. Guillet. (93) Feb.  
 L'Essai à la Bille sur les Métaux et Alliages Brut de Coulée.\* A. Portevin. (93) Feb.  
 Le Procédé Hadfield pour la Prévention des Soufflures et de la Ségregation.\* Ch. Dantin. (33) July 3.  
 Mikroskopische Stahluntersuchung.\* B. Strauss. (50) Dec. 10, 1914.  
 Untersuchungen über Lagermetalle: Antimon-Blei-Zinn-Legierungen.\* O. Bauer. (50) Serial beginning Apr. 29.  
 Der schiedbares Guss.\* Friedrich Erbreich. (50) Serial beginning May 27.  
 Zur Kenntnis der binären Aluminiumlegierungen. Hermann Schirmeister. (50) Serial beginning June 24.

**Military.**

- Fitting for Wave-Lining Shrapnel Shells.\* (11) Apr. 23.  
 American Experience with Guns and Ammunition.\* (22) Apr. 30.

---

\* Illustrated.





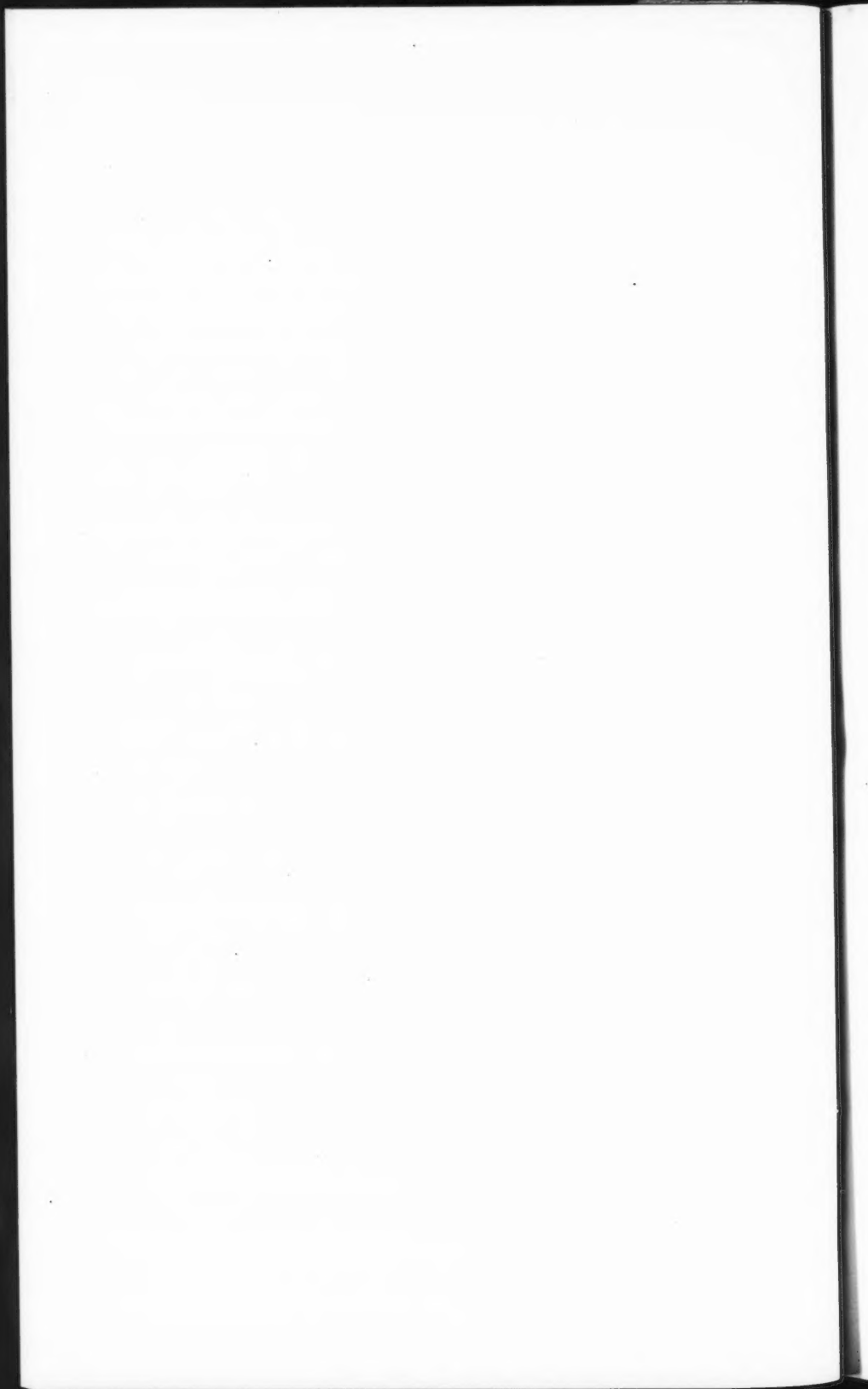
**Military—(Continued).**

- A Method for Calculating that Part of the Recoil Momentum of a Gun Which is Due to the Action of the Gases After the Projectile Leaves the Muzzle.\* Wm. S. Franklin. (3) May.
- Actual and Theoretical Ranges of the United States Coast Defense Guns.\* (46) May 22.
- Forging the Blanks for 18-Lb. British Shrapnel.\* E. A. Suverkrop. (72) Serial beginning May 27.
- Where Siege-Gun Tractors Are Made.\* (72) May 27.
- Chemical Engineering in Nitrocellulose Manufacture. S. L. Stadelman. (105) June.
- Machinery for the Production of Projectiles.\* (12) Serial beginning June 11; (108) Mar.
- Casting Steel Forging Blanks for 4.5 in. Explosive Shells. E. A. Suverkrop. (72) Serial beginning June 17.
- Shrapnel and Shrapnel Manufacture.\* Douglas T. Hamilton. (From *Machinery*.) (19) June 19.
- Rockets and Searchlights.\* John N. Hodges. (Translation from *Kriegstechnische Zeitschrift*.) (100) July.
- How Rifle Bullets Fly.\* Edward C. Crossman. (46) July 3.
- Les Fusils de Guerre Actuels; le Fusil français Lebel et le Fusil allemand Mauser.\* André Reynier. (33) Serial beginning May 29.
- La Lutte Contre les Gaz Asphyxiants de l'Armée allemande.\* Pierre Pascal. (33) June 12.
- Le Bruit du Canon et les Zones d'Ombre Acoustique ou de Silence.\* A. Goupil. (33) June 19.
- La Torpille Automobile.\* A. Dumas. (33) June 26.
- Geschossherstellung in kanadischen und amerikanischen Werkstätten.\* F. Heym. (50) May 27.
- Hand- und Gewehrgranaten.\* Polster. (48) May 29.
- Der verwaltungs- und wirtschaftstechnischen Kriegsmassnahmen. Max Ried. (53) June 11.

**Mining.**

- Coal-Dust Explosions. J. D. Morgan. (Paper read before the North Staffordshire Inst. of Min. and Mech. Engrs.) (106) Vol. 49, Pt. 2.
- Some Notes on the Explosion at Wharncleft Silkestone Colliery. L. T. O'Shea. (Paper read before the Midland Inst. of Min., Civ., and Mech. Engrs.) (106) Vol. 49, Pt. 2.
- Some Notes on Supporting the Roof in Coal-Mines. Frank N. Siddall. (Paper read before the Manchester Geol. and Min. Soc. (106) Vol. 49, Pt. 2.
- The Prevention of Overwinding and Overspeeding in Shafts. G. T. Poole. (Paper read before the North of England Inst. of Min. and Mech. Engrs.) (104) Vol. 49, Pt. 2.
- Coal-Mining in Mexico.\* E. O. Forster Brown. (Paper read before the North of England Inst. of Min. and Mech. Engrs.) (104) Vol. 49, Pt. 2.
- Electric Signalling in Mines: Important Home Office Experiments.\* (57) Apr. 23.
- Modern Developments in Hydraulic Stowing.\* (57) Apr. 23.
- Hydraulic Stowing in the Staffordshire Coalfield. J. Drummond Paton. (Paper read before the South Staffordshire and Warwickshire Institute of Mining Engineers.) (22) Apr. 23.
- Approved Safety Lamps.\* (57) Apr. 30.
- Report on Battery-Bell Signalling Systems.\* R. V. Wheeler. (73) Apr. 30; (22) Apr. 23.
- Coal Washing Plant at Manners Colliery, Ilkeston.\* (22) Apr. 30.
- Wages and Profits in the Coal Trade. (12) Apr. 30.
- Features of the Electrical Equipment for the Granite Mountain Hoist. G. B. Rosenblatt. (Paper read before the Montana Soc. of Engrs.) (1) May.
- Cost of Initial Mining Excavations. Eugene D. Gardner. (Paper read before the Montana Soc. of Engrs.) (1) May; (96) June 10.
- The Power Supply of the Central Mining-Rand Mines Group.\* J. H. Rider. (77) May 1.
- The Mine—An Educational Exhibit (Panama-Pacific Exposition).\* (103) May 1.
- Construction of Undercurrents.\* C. S. Haley. (103) May 1.
- Air-Blasts. (103) May 1.
- The Winding Plant at Burley Colliery.\* (73) May 7.
- Position of Copper during the War Period. John B. C. Kershaw. (12) May 7.
- Keyp Gear at a Midland Colliery.\* (57) May 7.
- Colliery Electric Lighting. G. S. Corlett. (22) May 7.
- Interesting Electrical Accessories.\* (22) May 7.
- Hydraulic Goaf Packing. (57) May 7.
- Coal Waste in Canada—and Its Conservation Problem. Frank D. Adams. (57) May 7.

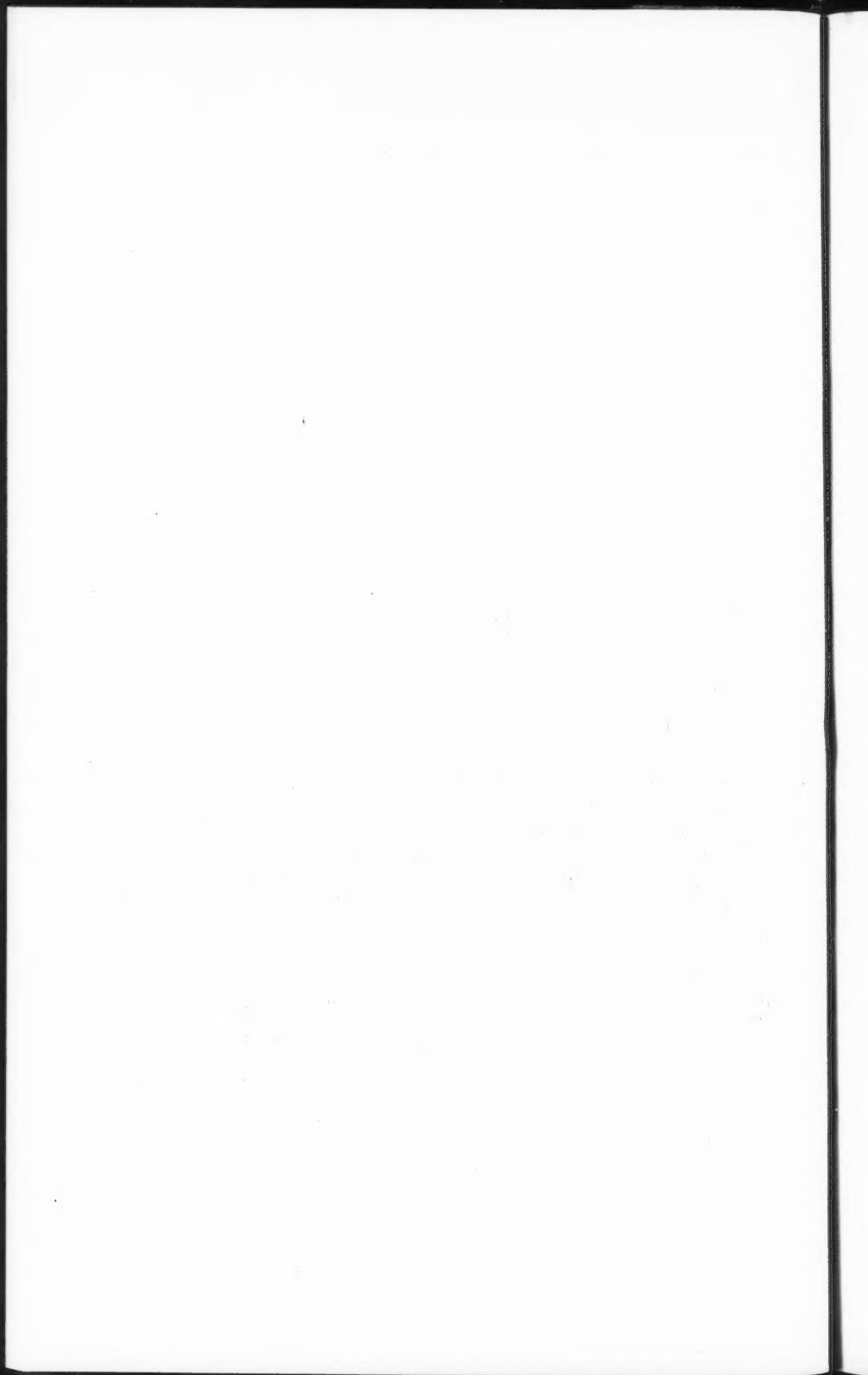
\* Illustrated.



**Mining—(Continued).**

- Coal Conveying at Wharnclyff Silkstone Colliery.\* (22) May 7.  
 Prospecting Methods at Fairbanks.\* Hubert I. Ellis. (16) May 8.  
 Quimsa Cruz Tin District, Bolivia.\* Francis Church Lincoln. (103) May 8.  
 Arrangement for Ventilating Sinking Shafts Winzes and Drives.\* S. Nettleton. (82) May 8.  
 The Steeple Rock Mining District, New Mexico.\* Faris V. Bush. (82) May 8.  
 Quantative Blowpipe Analysis in the Field. George Dellus. (103) May 8.  
 The Cone Bit for Rotary Drilling.\* Howard R. Hughes. (13) May 13.  
 Thermal Efficiency of Mining Steam Plants.\* J. Drummond Paton. (Paper read before the Manchester Geological and Mining Society.) (57) May 14.  
 Underground Transport Methods on the Rand.\* H. Stuart Martin. (Paper read before the South African Institution of Engineers.) (57) May 14.  
 The Coalfields of Spitzbergen.\* (57) May 14.  
 A Coal-Handling Plant at Camden Town.\* (57) May 14.  
 Extension of Iron-Ore Washing on Minnesota Ranges and Elsewhere.\* (82) May 15.  
 Stopping Methods at the Nevada Wonder Mine.\* Thomas M. Smither. (103) May 15.  
 Baillet on the Benefits of an Adequate Mine Ventilating System.\* (82) May 15.  
 Brazilian Monazite Sands Lie in Coastal Strip. Alfred L. M. Gottschalk. (82) May 15.  
 Apex Litigation: Jim Butler v. West End.\* H. V. Winchell. (103) May 15.  
 Reconnaissance of Goodsprings District, Nevada. J. Nelson Nevius. (82) May 15.  
 The Transformation of a Durham Colliery.\* Henry Holmes. (57) May 21.  
 A Special Type of Colliery Locomotive.\* (57) May 21.  
 Settling Tanks for Hydraulic Packing Plant (for Goaf).\* E. Steuer. (57) May 21.  
 Steam-Electric Driven Dredge for the Philippines (For Gold Dredging).\* (16) May 22.  
 Occurrence of Platinum at Boss Mine, Nevada. J. C. Kennedy. (82) May 22.  
 A Discussion of Hoisting Operations and Efficiencies.\* Letson Baillet. (82) May 22.  
 The Sapphire Mines of Yogo, Montana.\* (103) May 22.  
 Cribbed-Timbered Shafts in Kaolin Mines of North Carolina. (82) May 22.  
 Goldfield Revisited.\* T. A. Rickard. (103) Serial beginning May 22.  
 The North Moccasin Mountains of Montana.\* O. W. Freeman. (82) May 22.  
 The Efficiency of Tamping. Edgar A. Collins. (103) May 22.  
 The Largest Blast on Record.\* (13) May 27.  
 Coal Specifications and Proposals. U. S. Bureau of Mines. (22) May 28.  
 The Mother Lode Blast.\* F. S. Norcross, Jr. (16) May 29.  
 Merscham Deposits of New Mexico.\* Faris V. Bush. (16) May 29.  
 Alta and Cottonwood Mining Districts of Utah.\* P. H. Cropper. (82) May 29.  
 The North Butte Wing-Bar Design for Cages.\* (82) May 29.  
 Chile Copper Co. Ready for Operation.\* (82) May 29.  
 Electric Shot Firing in Kansas.\* Clark B. Carpenter. (45) June.  
 The Hojo Coal Mine, in Japan.\* S. Meguro. (45) Serial beginning June; (57) Apr. 30.  
 Efficiency in Coal Mining. George S. Brackett. (45) June.  
 Ferro-Concrete Shaft Linings.\* M. Gilleaux. (Paper read before the Assoc. des Ingenieurs Sortis de l'Ecole Polytechnique de Bruxelles.) (45) June.  
 Typhoon Blowers for Mine Auxiliary Ventilation.\* R. J. Shaw. (Paper read before the National Assoc. of Colliery Managers.) (22) June 4.  
 Platinum in Southern Nevada.\* Adolph Knopf. (103) June 5.  
 Pressure Ventilating System Used in Cripple Creek Mines.\* S. A. Worcester. (16) June 5.  
 Opportunities in China. H. T. Liang. (103) June 5.  
 Handling Ore at Surface. Ray Con. Copper Mines.\* C. A. Tupper. (82) June 5.  
 Concentrator of the Timber Butte Milling Co.\* Theodore Simons. (82) June 5.  
 Discussing the Efficiency of Mine Lighting.\* Letson Baillet. (82) June 5.  
 Operations of the Yukon Gold Company (Hydraulic Mining).\* (103) June 5.  
 Use of Explosives in Open Excavation Work. C. E. Munroe and C. Hall. (From *Bulletin 80*, U. S. Bureau of Mines.) (96) June 10.  
 The Elderlinsky Gold Mines.\* Nicolas T. Truschkoff. (16) June 12.  
 Development Methods at Fairbanks.\* Hubert I. Ellis. (16) June 12; (16) July 3.  
 Kaolin.\* Wilson W. Hughes. (103) June 19.  
 Progress at the Old Dominion Mine, Mill and Smelter.\* C. A. Tupper. (82) June 19.  
 Centrifugal Mine Pumps on the Rand.\* E. G. Izod and A. P. Rouillard. (Abstract of paper read before the South African Institution of Engrs.) (16) June 26.  
 Operating Costs at a Small Mexican Mine. Roy Hutchins Allen. (16) June 26.  
 Cost of Hydraulic Sand and Gravel Mining. R. J. Borhek. (86) June 30.

\* Illustrated.



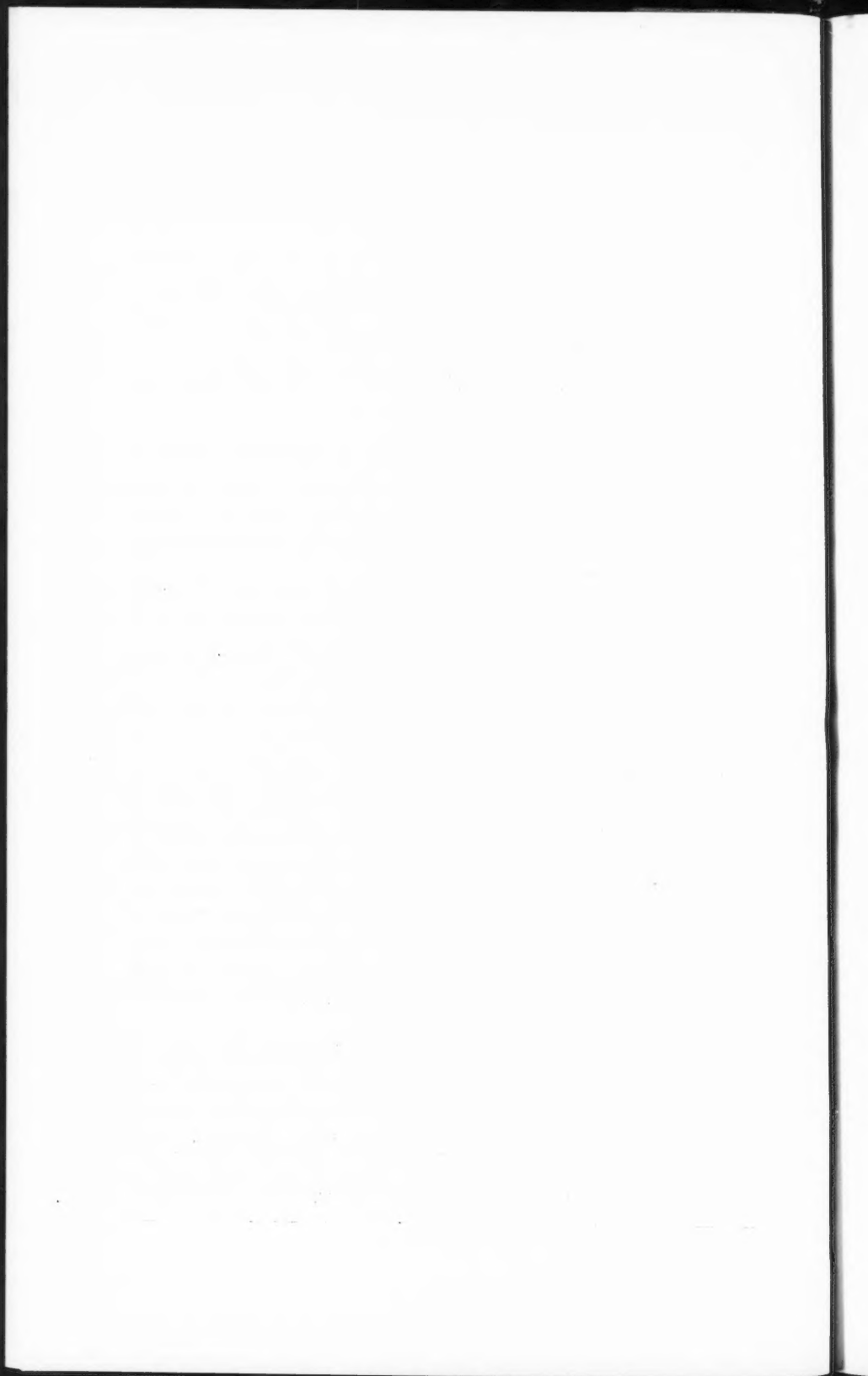
**Mining—(Continued).**

- Cereal Dust Explosions. Donald J. Price. (Paper read before the Fraternity of Operative Millers of America.) (45) July.  
 Rock Drills in Mining.\* L. O. Kellogg. (9) July.  
 Use and Abuse of Oil at Mines. C. T. Thomsen. (Paper read before the Assoc. of Min. Elec. Engrs.) (45) July.  
 Rapid Erection of Steel Coal Breaker.\* C. Stuart Phillips. (13) July 1.  
 New System of Concrete Lining Specially Adaptable to Collieries.\* (22) July 2.  
 Electric Generating Plant at Grassmoor Collieries.\* (22) July 2.  
 Interesting Improvement Scheme at an Important Group of Collieries in Northumberland.\* Frederick C. Coleman. (57) July 2.  
 Yorkshire Main Colliery.\* (22) July 2.  
 A Novel Debris-Dam (For a Mine).\* Leroy A. Palmer. (103) July 10.  
 Electric Power for Montana Mines, Mills and Smelters.\* Warren Aikens. (82) July 17.  
 Les Explosifs.\* Henry Le Chatelier. (93) Jan.

**Miscellaneous.**

- The Relation of Educational Training to the Practice of Engineering. William H. Burr. (58) Feb.  
 Public Service. Theodore N. Vail. (98) Apr.  
 Notes on National Forestry in Montana. Frank R. Ingalsbe. (Paper read before the Montana Soc. of Engrs.) (1) May.  
 The Extraction of Carbolic Acid from Oils of the Distillation of Coal Tar.\* William Mason. (105) May.  
 The Sensation of Light. (Paper read before the Illuminating Engineering Society.) (11) May 7.  
 Cost and Efficiency. Heath Steele. (103) May 8.  
 Recommended Alterations Affecting Engineers in the New York State Constitution. (86) May 12.  
 Organization and Equipment of Convict Camps in Georgia: Methods and Cost.\* John C. Koch. (86) Serial beginning May 12.  
 A Note on the Gyroscopic Compass. F. M. Denton. (73) May 14.  
 Appraisal of Public Utility Properties. Wm. G. Woolfolk. (Abstract of paper read before the Indiana Gas Assoc.) (83) May 15.  
 Industrial Journalism. Horace M. Swetland. (103) May 15.  
 Photographing on Both Sides of a Sheet.\* (20) May 20.  
 The Empire's Resources in Paper-Making Materials. S. Charles Phillips. (29) May 21.  
 Essentials of an Engineering Office Organization. (96) May 27.  
 Efficiency—Its Meaning. J. B. Brophy. (72) May 27.  
 Radioactivity.\* (11) May 28.  
 Glass Research. (29) May 28.  
 Cutting the Costs of Keeping a Cost System. A. M. Burroughs. (101) May 28.  
 Application of Engineering Methods to the Problems of the Executive Director and Trustee. Hollis Godfrey. (55) June.  
 The Application of the Theories of Public Regulation to the Management of Utilities. Douglas A. Graham. (59) June.  
 Ancient and Modern Accounting for Public Utilities. Edward A. Pratt. (59) June.  
 The Investment Banker and the Engineer. Charles A. Hobeln. (Paper read before the Engrs.' Club of St. Louis.) (1) June.  
 Rehabilitation of Existing Plants as a Factor in Production Costs.\* Harold V. Coes. (9) June.  
 High Temperature Investigation and a Study of Metallic Conduction.\* Edwin F. Northrup. (3) June.  
 Personal Character in Its Relation to Practical Efficiency. Charles H. Eglee. (28) June.  
 Report on Winter Unemployment. J. P. Newell. (Paper read before the Oregon Soc. of Engrs.) (1) June.  
 Seventy Years of Civil Engineering.\* (46) June 5.  
 The Time System of the United States. Charles T. Higginbotham. (19) June 12.  
 Public Utility Regulation in California. Max Thelen. (Paper read before the National Elec. Light Assoc.) (111) June 12.  
 Municipal Regulation of Public Utilities. John H. Roemer. (Paper read before the National Elec. Light Assoc.) (111) June 12.  
 Earth-Moving with Electric Dragline Excavators. (From *Reclamation Record*.) (13) June 17.  
 The Utilization of Time Study Data. Robt. Thurston Kent. (Paper read before the National Machine Tool Builders' Assoc.) (47) June 18; (20) May 27; (72) June 3.  
 Messhouse Management at the Arrowrock Dam.\* Ray R. Clawson. (13) June 24.  
 A Rational Method of Calculating Depreciated Value. Halbert P. Gillette. (86) July 14.

\* Illustrated.



**Miscellaneous—(Continued).**

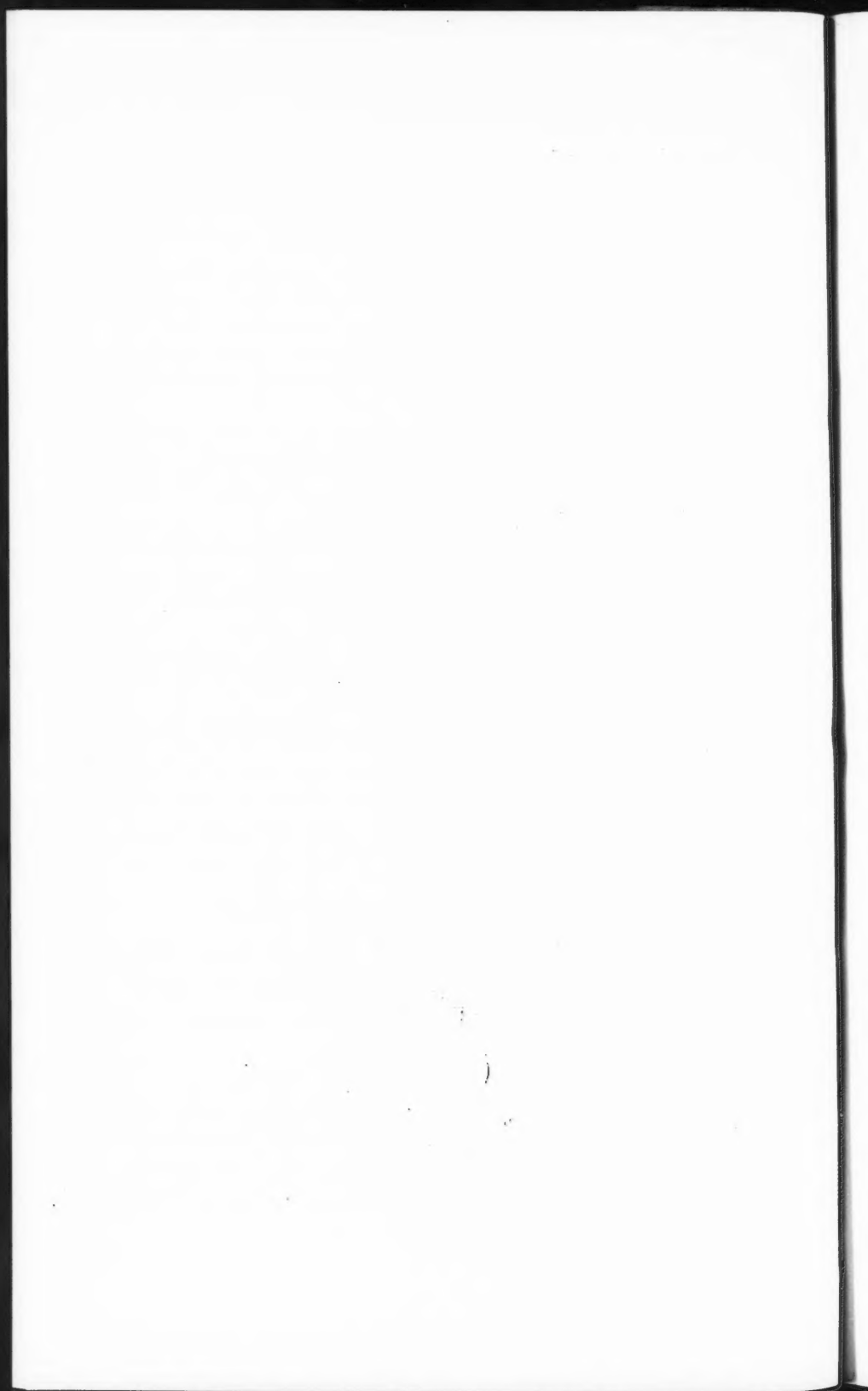
- The Regulation of Public Utilities by Competition in the Securities Market. F. K. Blue. (111) Serial beginning July 17.  
 State Should Deal Directly with Patentees of Processes and Materials in Public Work. S. Whinery. (14) July 17.  
 Le Réserve de Cuivre en Allemagne dans les Canalisations Publiques d'Electricité. F. Loppé. (33) July 10.  
 Abschliessende Feststellung des logarithmisch-tachymetrischen Messens.\* A. Tichy. (102) Mar. 15.  
 Ersatz für einige im Interesse der Landesverteidigung beschlagnahmte Rohstoffe.\* (48) Serial beginning June 5.  
 Zwei Bemerkungen über Trägheitsmomente ebener Figuren.\* Walter Tschuppik. (53) June 25.  
 Die Ermittlung von Entwicklungszeigern für Handelsbewegungen. Julius Marchet. (53) June 25.

**Municipal.**

- The Fundamental Elements Entering Into the Makeup of the Modern City and a Plea for a Smaller City.\* S. M. Swaab. (2) Apr.  
 Replanning and Redevelopment in Existing Areas. W. T. Lancashire. (104) Apr. 23.  
 Illinois Specifications for Concrete and Brick Pavements. (60) May.  
 Price and Cost of a Road.\* H. E. Bilger. (60) May.  
 Wood Fiber and Asphalt as Paving Materials.\* (60) May.  
 Protecting Concrete Curb Corners.\* (67) May.  
 Method of Determining Spacing of Joints in Concrete Pavements or Roads. H. J. Fixmer. (86) May 5.  
 Creosoted Wood-Block Paving Practice in St. Paul, Minn.\* (13) May 6.  
 Cost of Cleaning Various Kinds of City Pavements. (13) May 6.  
 Dust Prevention. W. W. Crosby. (Paper read before the Second Canadian and International Good Roads Convention.) (96) May 6.  
 Combined Mixer and Road Roller.\* (96) May 6.  
 Method of Applying Oil for Dust Prevention. (86) May 12.  
 A Comparative Study of Pavements Based on Chicago Conditions. H. J. Fixmer. (Paper read before the Illinois Society of Engineers and Surveyors.) (86) May 12.  
 Concrete Pavement Damaged by a Fire. (13) May 13.  
 Drainage of Earth Roads.\* (96) May 13.  
 Catering for the Wants of the Holiday Maker.\* Harry W. Smith. (104) May 14.  
 Design for the Lay-Out of a Park and Recreation Ground.\* W. Henry Price and Alfred J. Price. (104) May 14.  
 Bituminous Penetration Roads in Massachusetts Equal Those Built by the Mixing Method.\* (14) May 15.  
 Sand-Asphalt May Solve Florida Road Problem.\* Charles E. Foote. (14) May 15.  
 Table for Making Assessments for Paving. D. B. Davis. (86) May 19.  
 Some Methods and Costs of Concrete Pavement Construction at Des Plaines, Illinois.\* M. P. Taylor. (86) May 19.  
 Experience in Paving by Day Labor at Duluth, Minn. John Wilson. (86) May 19.  
 Methods of Applying Tars for Dust Prevention. (86) May 19.  
 Method of Estimating the Cost of a Concrete Road. (86) May 19.  
 Dust Prevention by Use of Oil. (96) May 20.  
 Garbage Reduction at Cleveland. (96) May 20.  
 Some of the Larger Problems of Town Planning. Thomas H. Mawson. (Paper read before the Town Planning Inst.) (104) May 21.  
 Cement-Sand Bed Best for Wood-Block Paving. Clark R. Mandigo. (14) May 22.  
 Methods Introduced in New York Last Winter Cut Cost and Increased Speed of Snow Removal.\* John T. Fetherston. (14) May 22.  
 Organization of Road Work Under the Illinois Highway Commission.\* (86) May 26.  
 Redressed Granite-Block Pavements.\* (13) May 27.  
 Oiling of City Streets. (96) May 27.  
 The City Manager *versus* Commission Government. (96) May 27.  
 Daily Cost-Data Sheets on Concrete Road Construction. (14) May 29.  
 Building a Two-Mile Speedway in Six Weeks.\* (14) May 29.  
 A Municipal Fertilizer Plant at Los Angeles, Calif. Burt A. Heinly. (13) June 3.  
 New Municipal Asphalt Plant for Borough of Manhattan.\* Henry Welles Durham. (13) June 3.  
 Thin Concrete Base, Reinforced, May Save 50 Cents a Square Yard in Paving Costs.\* James S. Tucker. (14) June 5.  
 Method and Cost of Street Oiling in Carlisle, Pennsylvania. John C. Hiteshaw. (86) June 9.

\* Illustrated.





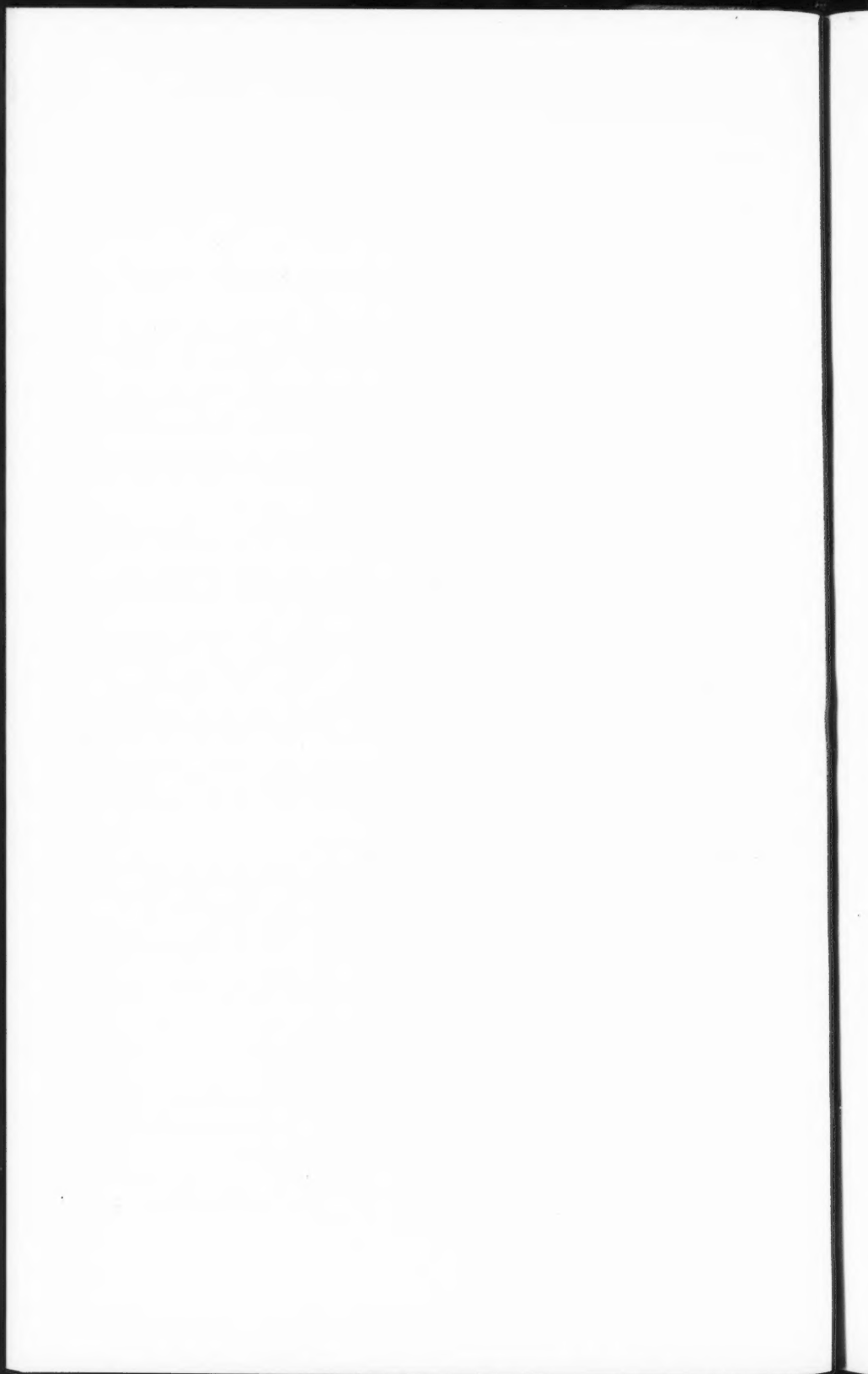
**Municipal—(Continued).**

- Cost of Resurfacing Macadam Walks with Asphalt, Lincoln Park, Chicago. M. D. Blumberg. (86) June 9.
- Road Maintenance Costs in Monroe County; New York State Highways. (86) June 9.
- The Concrete Pavements of Sioux City, Iowa.\* T. H. Johnson. (13) June 10.
- Sheepshead Bay Two-Mile Speedway Scientifically Designed for High Velocities.\* (14) June 12.
- How Minnesota Maintains Her Earth Roads.\* (14) June 12.
- Portable Mixer Uses Old Asphalt for Pavement Patches; Fifteen Men Take Up and Relay 180 Square Yards of Paving in One Day at Operating Cost of 42 Cents Per Square Yard.\* (13) June 15.
- Brick Pavement on Old Gravel Road Foundation for Portion of the Lincoln Highway. F. A. Churchill. (86) June 16.
- Cost of Macadam Object Lesson Roads in North Carolina. (86) June 16.
- Treated Wood Block Paving. (96) June 17.
- Economical Highway Design. W. G. Harger. (13) June 17.
- Alaska's Road and Bridge Builders Face Snow, Frozen Ground and Glacial Floods.\* Glen E. Edgerton. (14) June 19.
- An Efficiency System for Road Contractors.\* John H. Hammond. (86) June 23.
- The Binder Course in Asphalt Pavements. Robert Klotz. (13) July 1.
- Toronto-Hamilton Highway Construction.\* (96) July 1.
- The Adequacy of Bituminous Roads. G. H. Jack. (104) July 2.
- Iowa Experiments with Oil on Dirt Roads.\* (14) July 3.
- Brick Pavement Design. W. D. P. Warren. (86) July 7.
- Superelevation of Curves on Highways; Illinois Practice. H. E. Bilger. (13) July 8.
- Road Engineers and Heavy Traffic. Ernest J. Elford. (Abstract of paper read before the National Road Conference, London.) (104) July 9.
- Preparation and Laying of Tar-Macadam on Roads in Bedford. N. Greenshields. (104) July 9.
- Brick Road Built Monolithic at Paris, Illinois.\* (14) July 10.
- Road Construction in Reading Township, Livingston County, with Convict Labor.\* B. H. Piepmeyer. (86) July 14.
- The Motor Truck and the Road.\* John S. Harwhite. (19) July 17.
- Boulder Parapet for Roadways in Palisades Interstate Park.\* (13) July 22.
- Preliminary Surveys for Michigan Highways Cost \$2.72 Per Mile. (14) July 24.
- Patrol System for Pennsylvania Road Maintenance. (14) July 24.
- Uebergangserscheinungen im Städtebau.\* Kurt Diestel. (53) Serial beginning Feb. 5.
- Die Erweiterung der Stadt Antwerpen.\* Stübben. (40) Serial beginning Mar. 10.
- Baulandumlegungen.\* Ehlgötz. (39) Serial beginning Apr. 5.
- Städtische Verkehrsfragen in Wien. Gustav Schimpff. (51) Serial beginning May 22.

**Railroads.**

- Steel Passenger Car Frame Construction. C. Brady. (5) Vol. 28, Pt. 2, 1914.
- Audible and Other Cab Signals on British Railways.\* W. C. Acfield, Leon P. Lewis, Vincent L. Raven, W. A. Stainer and W. Willox. (75) Oct., 1914.
- Cumberland Valley Railroad Crossing of the Susquehanna and Elimination of the Grade Crossings in Harrisburg.\* Thos. B. Kennedy. (98) Apr.
- The C. M. & St. P. Electrification. C. A. Goodnow. (4) Apr.
- The New York, New Haven and Hartford Electrification. Wm. S. Murray. (4) Apr.
- New York Central Electrification. Edwin B. Katte. (4) Apr.
- The Norfolk & Western and Pennsylvania Electrifications. George Gibbs. (4) Apr.
- The Princess Christian Hospital Train.\* (23) Apr. 23.
- Variable Resistance Helical Spring Gear.\* (11) Apr. 23.
- Railway Engineering Work in Switzerland. (12) Apr. 23.
- New 0-8-0 Type Tank Locomotive for Egypt.\* (23) Apr. 30.
- Compound Locomotive, Swedish State Railways.\* (12) Apr. 30.
- Petrol Rail Coach Engine.\* (12) Apr. 30.
- London, Manchester and Bradford Express Trains; Great Central Railway.\* (21) May.
- The Distant Signal and Three Position Signalling. (21) Serial beginning May.
- Tunnels for Railways.\* (21) Serial beginning May.
- 4-6-2 Oil-Burning Engines, Roumanian State Railways. (21) May.
- 3d Class Sleeping Cars; Swedish State Railways.\* (21) May.
- High-Power Locomotives.\* (21) May.
- The Physical Valuation of the Railways.\* H. H. Edgerton, Jr. (87) May.

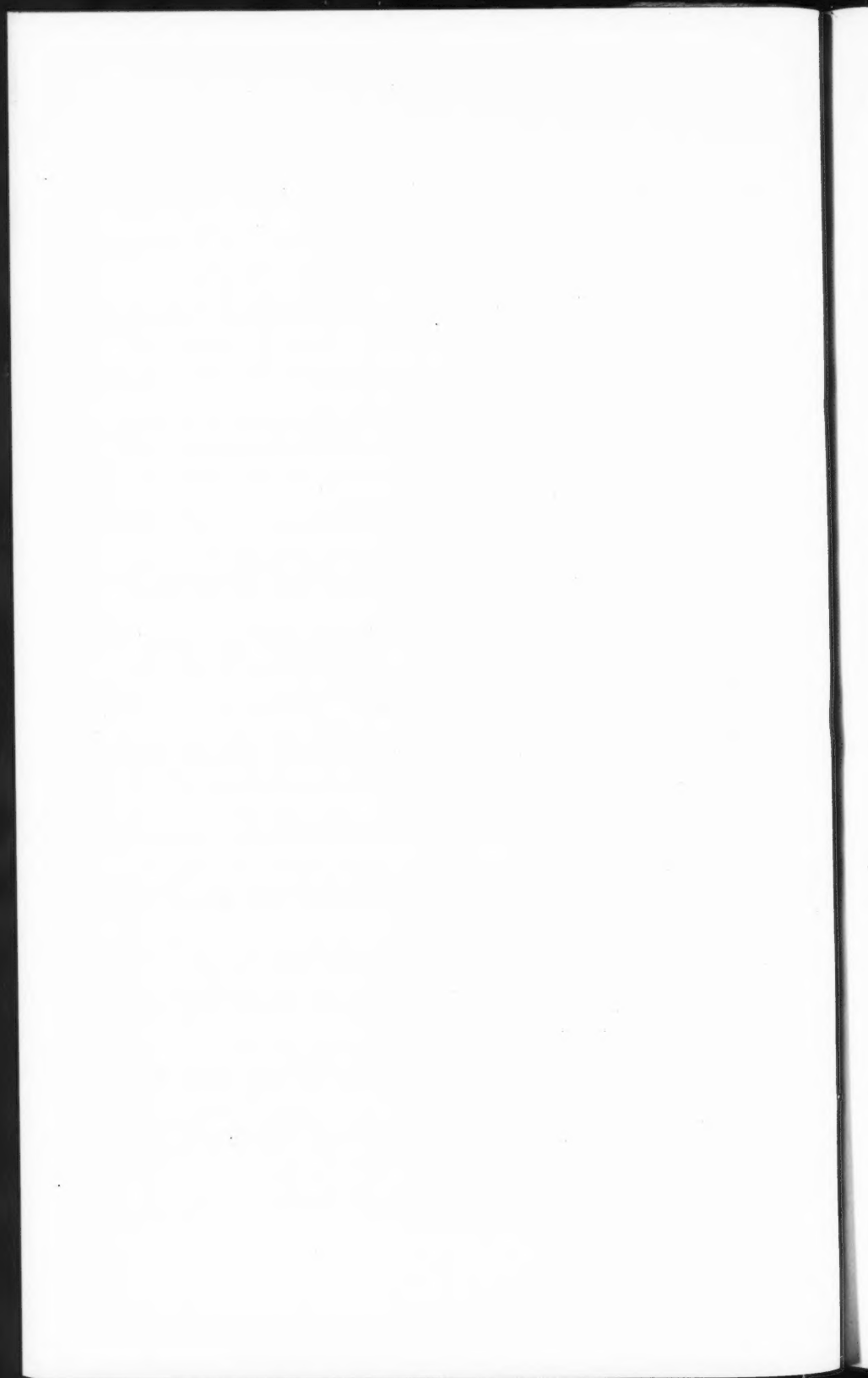
\* Illustrated.



**Railroads—(Continued).**

- The Modern 150-Ton Track Scale.\* (87) May.  
 The Snoqualmie Tunnel, C. M. & St. P.\* (87) May.  
 Terminal Improvements, Canadian Pacific, Vancouver, B. C.\* (87) May.  
 Conditions Affecting the Success of Main Line Electrification.\* W. S. Murray (3) May.  
 Recent Developments in Locomotives.\* George R. Henderson. (65) May.  
 Tests of Exhaust Ventilators. George L. Fowler. (25) May; (15) May 14.  
 Flight-Wheel Caboose with Steel Underframe.\* E. F. Givin. (25) May.  
 Considerations Affecting the Type of Center Sills in Steel Passenger Equipment. L. K. Silcox. (25) May.  
 Feed Water Heater Used on Geared Locomotives.\* Harold S. Johnson. (25) May.  
 Good Features of Tender Tank Design.\* Walter R. Hedeman. (25) May.  
 Water Tube Firebox on the Lackawanna.\* (25) May.  
 Santa Fe Pacific Type Locomotive.\* (25) May.  
 Dynamometer Cars for the Southern Railway.\* (18) May 1.  
 Mikado and Pacific Type Locomotives for the Nashville, Chattanooga & St. Louis Ry.\* (18) May 1; (11) June 18; (15) May 7.  
 Reduction in Trans-Continental Rates Allowed to Meet Canal Competition. (18) May 1.  
 Use of Ball Bearings on Swedish Railways.\* (From *Die Lokomotive*.) (18) May 1.  
 The New Michigan Central Yard at Detroit.\* (23) May 7.  
 Lining Tunnels on the New Lewistown-Great Falls Line of the St. Paul.\* (15) May 7.  
 Baldwin Locomotives at the Panama Pacific Exhibition.\* (12) May 7.  
 Construction of New Line to Reach Utah Coal Fields.\* (15) May 7.  
 Reclamation of Scrap on the Great Northern.\* (15) May 7; (25) June.  
 Railroad Fuel Economy. M. C. M. Hatch. (Paper read before the New England Railroad Club.) (47) May 7.  
 Annual Cost of Locomotive Upkeep.\* (12) May 7.  
 High-Capacity Wagons for South African Railways.\* (11) May 7.  
 Concrete Signal Towers, Delaware, Lackawanna & Western R. R.\* (18) May 8.  
 Improvement in the Operation of the Pneumatic Signal Device.\* (18) May 8.  
 Alloyed Steel Rails and Joint Plates (Case School of Applied Science Tests). (96) May 13.  
 New Line of the Chesapeake & Ohio Northern.\* (15) May 14.  
 The Pennsylvania Improvements through Piqua, Ohio.\* (15) May 14.  
 Safety and Short Trains. Marcus A. Dow. (15) May 14.  
 Heavy 2-8-0 Locomotive for the Bengal-Nagpur Railway.\* (23) May 14.  
 Narrow-Gauge High-Capacity Wagons for the Burma Mines Railway.\* (23) May 14.  
 Standard Point Switch for Either Hand-Throw or Interlocking Connections, N. Y. C. R. R.\* (18) May 15.  
 Steel Parlor Cars for Waterloo-Cedar Rapids Line.\* (17) May 15.  
 Interlocking Installation on Pacific Electric.\* (17) May 15.  
 Track Layout and Signals of the Jersey City Passenger Terminal of the Central R. R. of New Jersey.\* (18) May 15.  
 Railway Construction in Republic of Panama: Earlier Projects and Work Now under Way. R. W. Hebard. (86) May 19.  
 United States Rail Production in 1914. (96) May 20.  
 Small Locomotives for Construction and Industrial Service.\* (13) May 20.  
 Some New Ideas in Rail Joints.\* (13) May 20.  
 South African Locomotives.\* (23) May 21.  
 St. David's Station, Exeter, Reconstruction.\* (23) May 21.  
 Railway and Industrial Schemes in China. A. C. Clear. (29) May 21.  
 The Southern Shan States Railway.\* (12) May 21.  
 Commissions Findings Relative to the Cummins Law That Full Liability Is Demanded by the Statute Does Not Allow the Carriers to Increase Their Rates. (15) May 21.  
 Opening of the Mont D'Or Tunnel.\* (12) May 21.  
 Renewal of Ties; Inspection, Marking and Records.\* (15) May 21.  
 The Design and Construction of Small Stations.\* (15) May 21.  
 Air Cooling Plant, New York Central R. R. Mott Haven Yard, New York.\* Mark Purcell and M. F. Gannon. (Paper read before the Air Brake Assoc.) (18) May 22.  
 Training Steam Railroad Men for Electric Operation.\* Clarence Roberts. (17) May 22.  
 Maximum Use of Industrial Railway Possible at Low Cost. Fred Tarrant. (14) May 22.  
 Temporary Timber Walls for Track Elevation.\* (14) May 22.  
 A Shockless Railroad Crossing.\* (17) May 22.  
 Meter Results on Chicago and Milwaukee Line.\* (17) May 22.

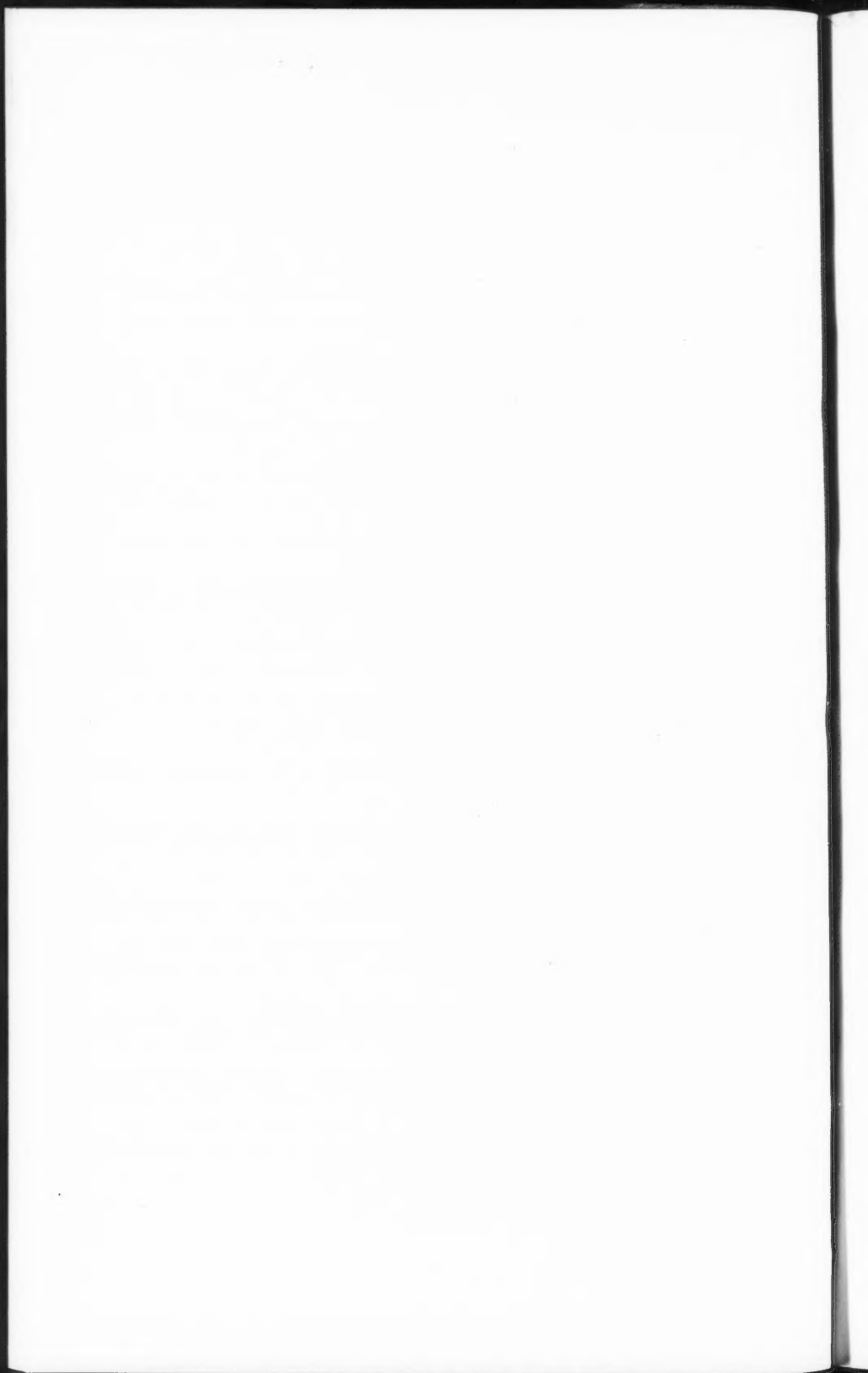
\* Illustrated.



**Railroads—(Continued).**

- Concrete-Block and Cellular Retaining Walls.\* W. S. Lacher. (13) May 27.  
 4-8-0 Type Locomotive for the Uganda Railway.\* (23) May 28.  
 First-Class Motor Cars for the Central Argentine Railway.\* (23) May 28.  
 A Modern Concrete and Brick Roundhouse at Du Bois, Pa.\* (15) May 28.  
 Preparing for the Federal Valuation of the Railways. (15) May 28.  
 The Gretna Railway Accident.\* (12) May 28; (11) May 28; (23) May 28.  
 Storage of Coal. (Discussion before the International Railway Fuel Association.)  
 (15) May 28; (18) May 22.  
 Concrete Trestles on Tennessee Division Second Track, Illinois Central R. R.\*  
 Maro Johnson. (18) May 29.  
 The Furka Railway.\* Alfred Gradenwitz. (19) May 29.  
 The Public Service Corporation and the Municipality. James Logan. (109) June.  
 A Review of the Art of Signalling and Some Suggestions. A. F. Bound. (Abstract  
 of paper read before the Institution of Railway Signal Engrs.) (21) Serial  
 beginning June.  
 The Contact System of the Southern Pacific Company, Portland Division.\* Paul  
 Ledenbaum. (42) June.  
 Ambulance Train No. 14 for Service on the Continent.\* (21) June.  
 Qualities of Good Steel Rails.\* Gustav Lindenthal. (65) June.  
 Third Rail and Trolley System of the West Jersey and Seashore Railroad.\* J. V.  
 B. Duer. (42) June.  
 The Public Versus the Public Service Corporations.\* Henry D. Jackson. (9)  
 June.  
 Steel Frame Double Truck Caboose.\* (25) June.  
 Mechanical Stokers. (Report of Committee of the Internat. Ry. Fuel Assoc.)  
 (25) June; (23) May 7; (15) May 28.  
 Automatic Train Control. (21) Serial beginning June.  
 Development of Main-Line Signalling on Railways.\* W. C. Acfield. (77) June 1.  
 Bureau of Standards and Railroads Confer; Coöperation Sought between the Rail-  
 roads and the Bureau Regarding Best Method of Studying Steel-Rail Problems.  
 (20) June 3.  
 Recent Locomotive Performance on the Great Northern Railway. (12) Serial  
 beginning June 4.  
 Metropolitan Railway Company's Goods Depot at Farringdon Street.\* (23)  
 June 4.  
 Baldwin 4-6-2 Type Locomotives for the New Zealand Government Railways.\*  
 (23) June 4.  
 Fundamental Problems Involved in Railway Valuation. (15) June 4.  
 American Locomotive Trailing Trucks.\* (11) Serial beginning June 4.  
 A Billion Dollar Confiscation. Morrell Walker Gates. (15) June 4.  
 Report of Chicago Railway Terminal Commission. (15) June 4.  
 The Chicago, Milwaukee & St. Paul Locomotives.\* A. H. Armstrong. (17)  
 June 5.  
 Transportation on Land and Sea.\* (46) June 5.  
 The Hanna Locomotive Stoker.\* (18) June 5.  
 Fuel Oil for Locomotives.\* G. M. Bean. (Paper read before the Internat. Ry.  
 Fuel Assoc.) (18) June 5; (25) June; (47) July 2; (15) May 28; (96)  
 July 15.  
 A 4-4-4 Type Locomotive, Philadelphia & Reading Ry.\* (18) June 5; (15)  
 June 9.  
 The Norfolk & Western Electrification.\* (17) June 5; (13) June 24; (15) June 4;  
 (64) June 22; (13) June 17; (14) June 5; (19) June 12; (27) June 5;  
 (18) June 5.  
 Locomotive Stokers. (Report of Committee to American Railway Master Mechanics'  
 Association.) (15) June 10.  
 Steel Suburban Passenger Cars for the Erie R. R.\* (13) June 10; (17) June 12;  
 (25) July; (15) June 11.  
 Lateral Stresses in Rails on Straight Track.\* George L. Fowler. (15) June 11.  
 Single-Track Automatic Signals on Toronto, Hamilton & Buffalo.\* (15) June 11.  
 Overhead Charges in Valuation. Richard Hoadley Tingley. (15) June 11.  
 Locomotive Headlights.\* (Paper read before the American Railway Master  
 Mechanics' Association.) (15) June 11.  
 Design, Construction and Inspection of Locomotive Boilers. (Report of Committee  
 to American Railway Master Mechanics' Association.) (15) June 11.  
 The Measurement of Efficiency in Yard Operation. J. W. Roberts. (15) June 11.  
 The Bettendorf All-Steel Box Car.\* (18) June 12.  
 Electrification of the Jamestown, Westfield & Northwestern Railroad.\* (17)  
 June 12.  
 The Westinghouse Electro-pneumatic Air Brake on the Pennsylvania Railroad.\*  
 Herbert T. Wade. (46) June 12.  
 Point Defiance Line Eliminates Last Heavy Grade between Tacoma and Portland.\*  
 David L. Soltan. (14) June 12.

\* Illustrated.

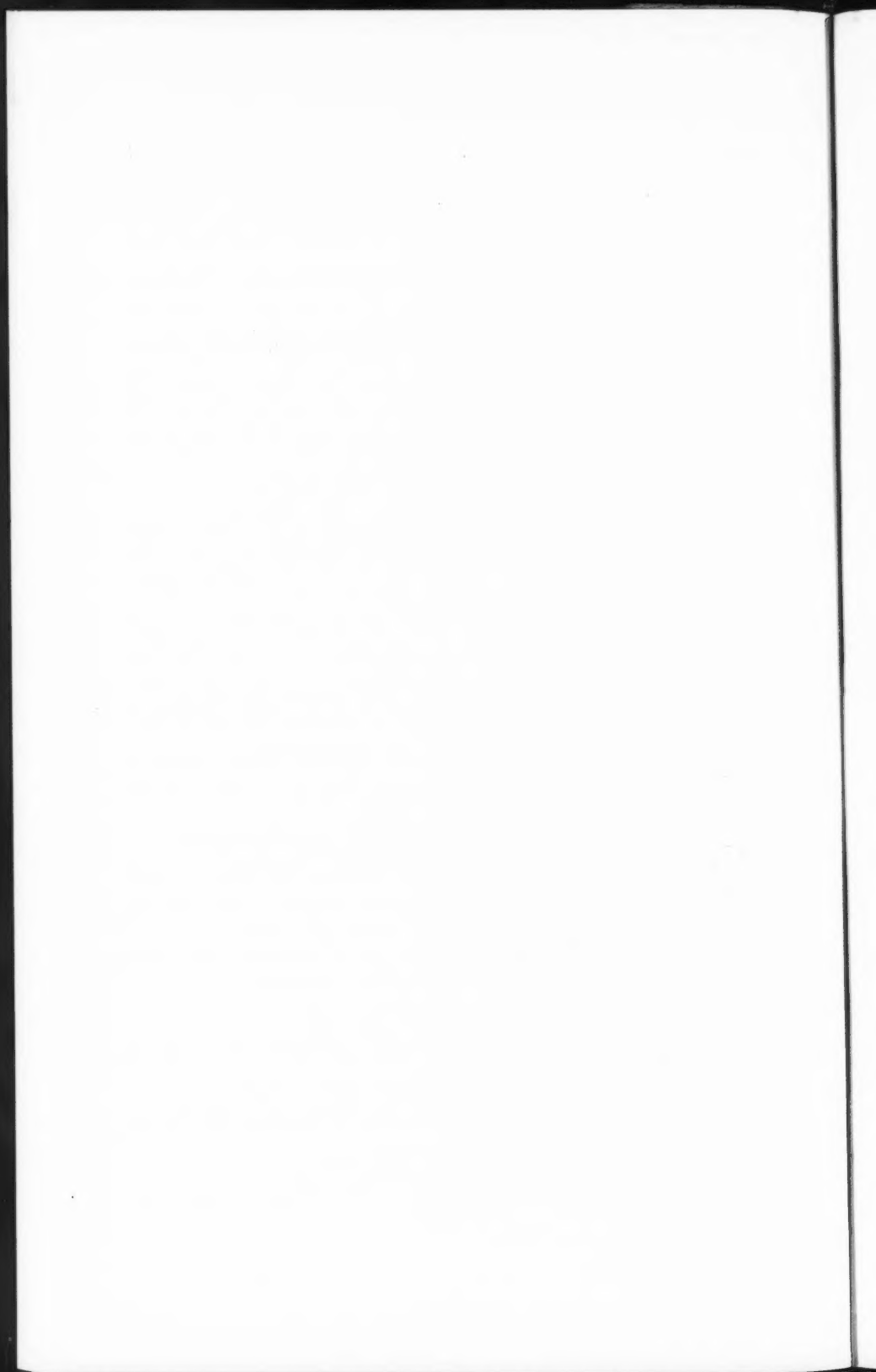




**Railroads—(Continued).**

- Report on Wreck Due to Broken Car Wheel (Chicago, Milwaukee & St. Paul Ry.).  
H. W. Belnap. (Report to the Interstate Commerce Comm.) (18) June 12.
- Systematic Value Setting on Locomotives. J. R. Britton. (Paper read before the Canadian Ry. Club.) (18) June 12.
- Flange and Screw Couplings for Injectors (For Locomotives).\* (15) June 12.
- Counterbalancing. (Report of Committee to American Railway Master Mechanics' Association.) (15) June 12.
- Brake Shoe and Brake Beam Equipment.\* (Report of Committee to Master Car Builders' Assoc.) (15) June 15.
- Couplers.\* (Report of Committee to Master Car Builders' Assoc.) (15) June 16.
- Car Construction.\* (Report of Committee to Master Car Builders' Assoc.) (15) June 16; (18) July 3.
- Train Lighting.\* (Report of Committee of the Master Car Builders' Assoc.) (15) June 17.
- Car Trucks.\* (Report of Committee of the Master Car Builders' Assoc.) (15) June 17.
- Impact Between Freight Cars in Switching Service.\* Louis C. Endsley. (Paper read before the Master Car Builders' Assoc.) (15) June 7; (18) July 3.
- Chicago Freight Interchange Yard.\* (13) June 17.
- A Locomotive Testing-Plant Product. (11) June 18.
- New Station and Track Elevation at Memphis.\* (23) June 18.
- The Weir System on the Great Eastern Railway.\* (23) June 18.
- The Ticket Offices of Large Passenger Terminals. (15) June 18.
- Necessity for Additional Revenues on Western Railways. C. C. Wright. (Paper read before the Interstate Commerce Comm.) (15) June 18.
- Using Bulk Cement on Railway Construction Work.\* MacRae D. Campbell. (15) June 18.
- Recent Important Developments in Ballast Practice.\* John Evans and others. (15) June 18.
- Locomotives Recently Built for Foreign Countries.\* (15) June 18.
- Engineers and Public Service. M. E. Cooley. (Paper read before the Central Elec. Ry. Assoc.) (17) June 19.
- Mountain Type Locomotives for the Seaboard Air Line.\* (18) June 19; (15) July 16.
- Fuel Oil Installations on the Grand Trunk Pacific Ry.\* J. G. Le Grand. (Paper read before the Western Canada Ry. Club.) (18) June 19; (96) May 6.
- Wash Borings Aid in Railroad Valuation Work.\* P. E. Thian. (Abstract of paper read before the Northwestern Assoc. of Members of the Am. Soc. Civ. Engrs.) (14) June 19.
- Michigan Railway's 2 400-Volt, Third-Rail Line.\* (17) June 19.
- Some Important Considerations in Right of Way Valuation. Halbert P. Gillette. (15) June 25; (86) June 30.
- Rail Motor Car for the New Zealand Government Railways.\* (23) June 25; (21) July.
- The Railway Problem of London.\* (12) June 25.
- Transportation in Chicago During a Traction Strike.\* (15) June 25.
- Steel Passenger Equipment for the Union Pacific.\* (15) June 25; (25) July.
- The Julian Train Control and Automatic Stop.\* (15) June 25.
- Automatic Block Signal Installation on the B. R. & P. Ry.\* Clyde R. Happ. (18) June 26.
- Alternative Plans for Rearranging Chicago Freight Terminals.\* (18) June 26.
- Steel Ties Under Hot Ashes.\* (18) June 26.
- Performance of 13 Track Scales. A. M. Van Auken. (87) July.
- Test of Track Scale. (87) July.
- A Modern Low-Pressure Compound Locomotive and Its Working.\* (21) Serial beginning July.
- Reducing Piston Valve Leakage.\* V. T. Kropidlowski. (25) July.
- Mountain Slides. D. C. Davis. (87) July.
- Locomotive Shop Buildings of Concrete Block Walls.\* (67) July.
- Locomotive Superheaters.\* R. M. Ostermann. (55) July.
- The Electric Locomotive.\* A. H. Armstrong. (55) July.
- Forged and Rolled Steel Pistons.\* W. W. Scott, Jr. (Paper read before the Ry. Club of Pittsburgh.) (25) July.
- Stopping a Difficult Slide by the Use of Explosives.\* (13) July 1.
- Built-Up Car Wheels Declared Inadequate.\* (13) July 1.
- The Federal Railway-Valuation Work. George H. Burgess. (13) July 1.
- The Carriage and Wagon Works of the Bombay, Baroda & Central India Railway Metre-Gauge System.\* (23) July 2.
- New Goods Locomotives for India.\* (23) July 2.
- New Railroad Legislation in Fifteen States. (15) July 2.
- Goods Locomotive for the Hull and Barnsley Railway.\* (11) July 2.
- A 15-Cycle, Single-Phase Railway in California.\* (12) July 2.

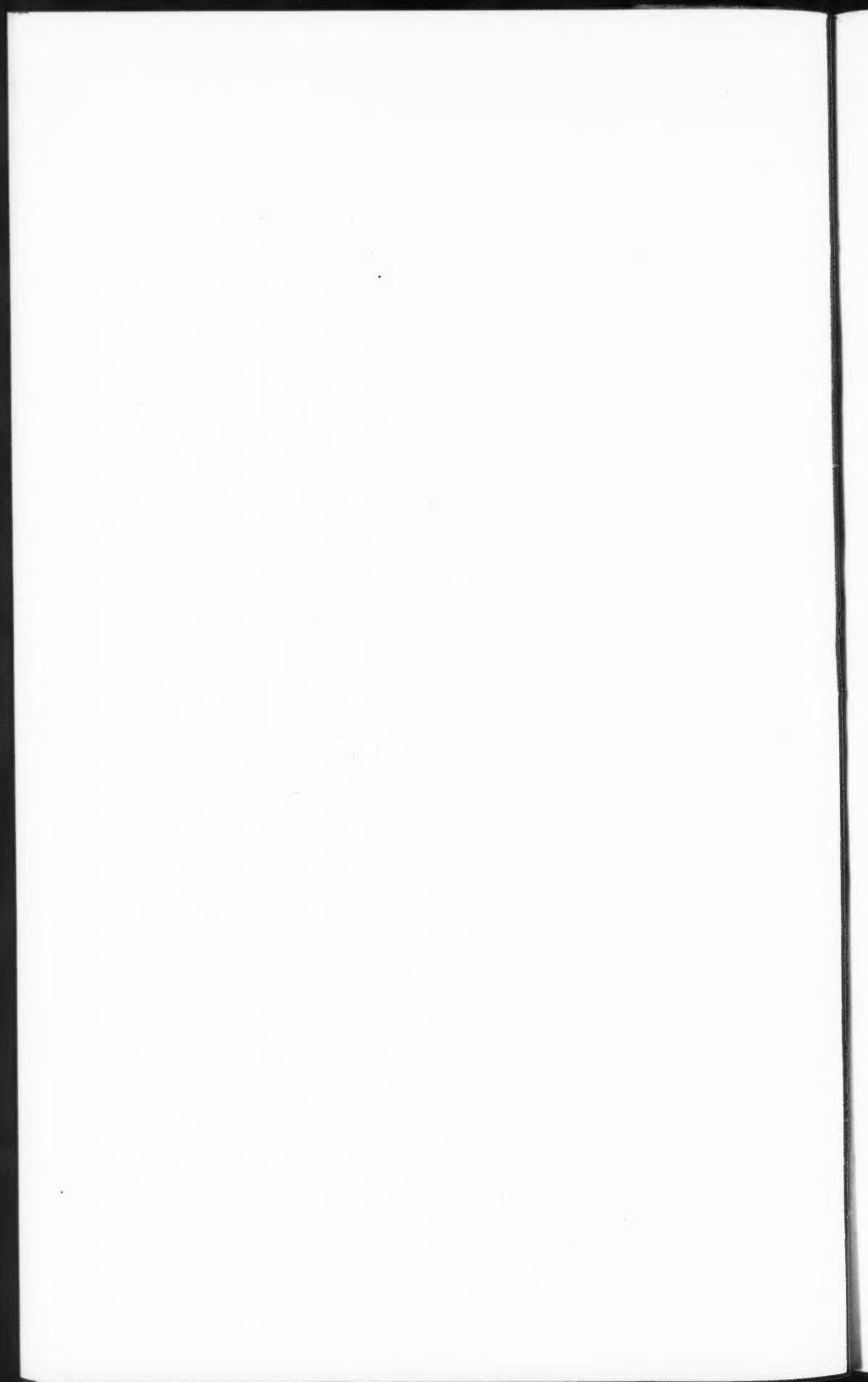
\* Illustrated.



**Railroads—(Continued).**

- Automatic Signals on Norfolk & Western Electrified Lines.\* (15) July 2.  
 Bath Trains of the Russian Army.\* (46) July 3.  
 Electric Hoist of the Hamilton Inclined Railway.\* (13) July 8.  
 Reinforced Concrete Ties After Service.\* (13) July 8.  
 Eliminating Tower Grove Grade Crossing at St. Louis.\* (13) July 8.  
 Crane Locomotive for the Great Indian Peninsula Railway.\* (23) July 9.  
 Variable Exhaust Nozzles for Locomotives.\* J. Snowden Bell. (Abstract of paper read before the Am. Ry. Master Mechanics' Assoc.) (47) July 9.  
 The Thomas Transmission Rail Coach.\* (12) July 9; (11) June 25; (47) July 9; (26) June 25.  
 New Delaware & Hudson Terminal at Albany, N. Y.\* (15) July 9.  
 Electrification of the Pennsylvania Railroad's Suburban Line at Philadelphia.\* (18) July 10.  
 Electrification of Terminal Line at Great Falls, Mont., Chicago, Milwaukee & St. Paul Ry.\* (18) July 10.  
 Railroads Under and Over the Streets of New York.\* (19) Serial beginning July 10.  
 Data on Four Years' Performance, Electric Locomotives of the Pennsylvania R. R.\* (18) July 10.  
 One Hundred Per Cent. Operative Brakes in Freight Service.\* Geo. H. Wood and S. C. Wheeler. (Paper read before the Air Brake Assoc.) (18) July 10.  
 Driving and Lining Carried on Simultaneously at Snoqualmie Tunnel Saved Timbering.\* R. W. Rae. (14) July 10.  
 First 2400-Volt, Third-Rail Line is Built.\* (14) July 10.  
 Track Depression at Mattoon; Illinois Central R. R.\* (13) July 15.  
 Making a Physical Valuation of Large Terminals. Claude L. Van Auken. (15) July 16.  
 The Experimental Determination of Stresses in Track.\* C. C. Williams. (15) July 16.  
 Hearing on Advances in Western Passenger Fares. (Before the Interstate Commerce Comm.) (15) July 16; (18) July 17.  
 The Relative Efficiency of Various Ballast Materials.\* G. W. Vaughan. (15) July 16.  
 Uses of Locomotive Crane in Railway Service.\* (15) July 16.  
 Earth Pressures Determined by Laboratory Apparatus.\* J. H. Smith. (Abstract of paper read before the Am. Soc. for Testing Materials.) (14) July 17.  
 Track Depression Work of the C. M. & St. P. Ry. at Minneapolis.\* (18) July 17.  
 Valves and Valve Gearing. (Report of Committee of the International Railway General Foremen's Assoc.) (18) July 17.  
 Automatic Block Signals on an Interurban Railway.\* (13) July 22.  
 New Lehigh Valley Passenger and Freight Terminals at Buffalo.\* (15) July 23.  
 The Pennsylvania's 1915 Rail Specifications.\* (15) July 23.  
 The Heart of the Locomotive.\* C. H. Claudy. (19) July 24.  
 Les Grands Réseaux d'Intérêt Local; Etude Comparative de la Traction à Vapeur et de la Traction Electrique. Gustave Chauveau. (32) July, 1914.  
 Foyers Automatiques pour Locomotives.\* (33) May 8.  
 Machine à Forer les Tunnels, Système Karns.\* F. Hofer. (33) May 15.  
 Les Chemins de Fer en Asie Mineure, l'Etat d'Avancement du Chemin de Fer de Bagdad. Ch. Dantin. (33) June 5.  
 La Traction Electrique sur les Chemins de Fer de l'Etat italien, Locomotive à Courant Triphasé, Système Westinghouse.\* P. Calfas. (33) Serial beginning July 10.  
 Die geplante Saharaquerbahn.\* (40) Feb. 13, 1914.  
 Die augenblickliche Drehachse bei der Bewegung der Eisenbahnfahrzeuge in Bogen.\* Boedecker. (102) Serial beginning Jan. 15.  
 Kleinere Eisenbahnempfangsgebäude im Direktionsbezirk Cassel.\* Holtmeyer. (40) Serial beginning Jan. 16.  
 Der Bogenwiderstand steifachsiger Eisenbahnwagen.\* Boedecker. (40) Serial beginning Jan. 30.  
 Einfahranlagen für Verschiebebahnhöfe. Sammet. (102) Serial beginning Feb. 15.  
 Kennzeichnung verschleißfesten Schienenstoffes.\* Füchsel. (102) Mar. 1.  
 Kniehebel für Zug-, Druck- und Hebe-Vorrichtungen.\* G. Rosenfeldt. (102) Mar. 15.  
 Theorie der Anlagen zur Bekohlung der Lokomotiven. Fr. Landsberg. (102) Serial beginning Mar. 15.  
 Die elektrischen Lokomotiven der Wendelstein-Bahn in Oberbayern.\* (107) Mar. 27.  
 Stellwerk aus Eisenbeton auf dem Hauptbahnhof Leipzig.\* Haufe. (40) Mar. 27.  
 Berechnung der Leistung und der Heizstoffes für Lokomotiven. M. Jgel. (102) Serial beginning Apr. 1.  
 Ueber die Beanspruchung des Zapfen und Stangenschäfte des Triebwerkes der Lokomotiven. Heumann. (102) Apr. 1.

\* Illustrated.



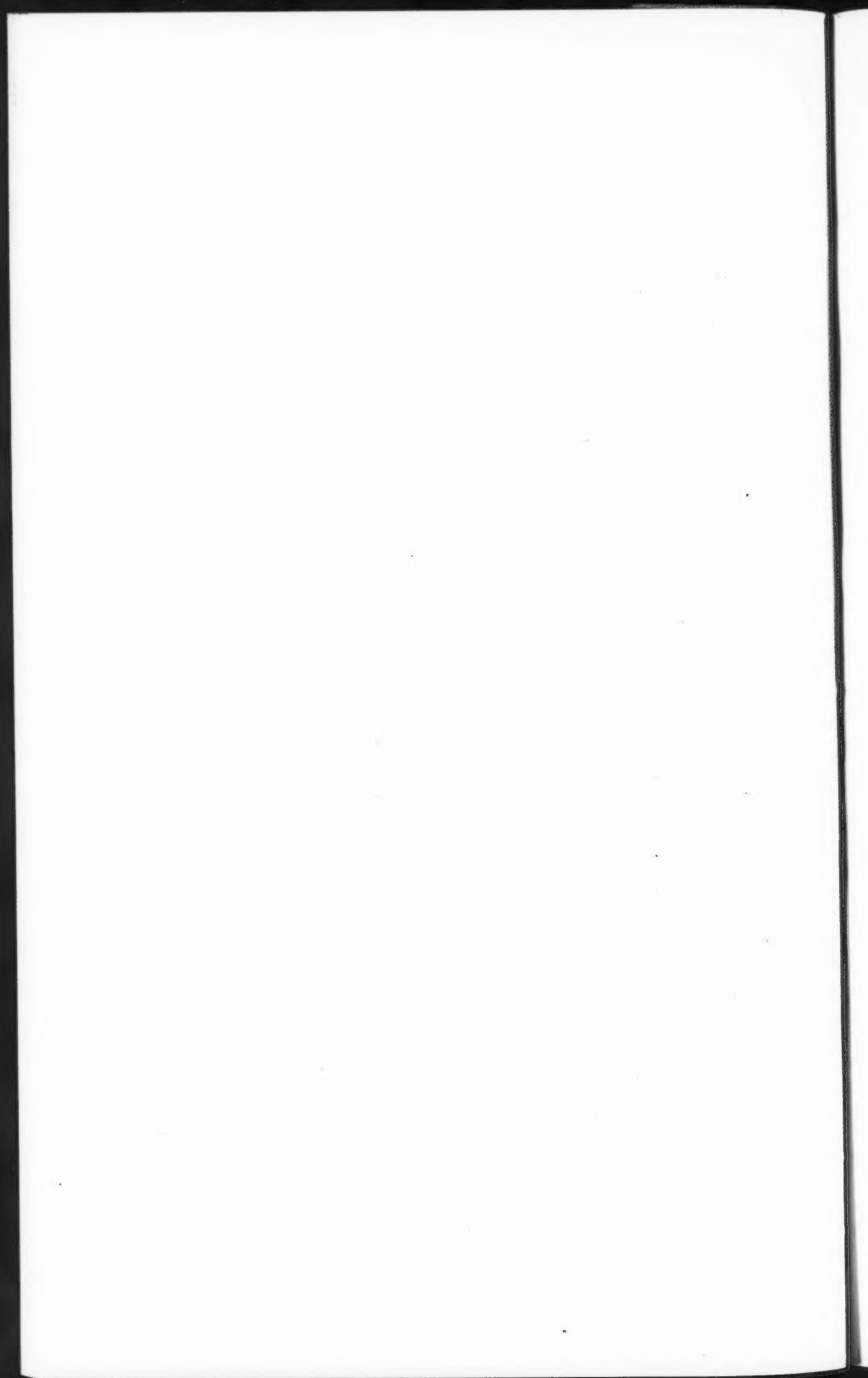
**Railroads—(Continued).**

- Die Trockenhaltung und Gerauschdampfung des Gleiskörpers aus Beton. Scheuermann. (39) Serial beginning Apr. 5.
- Technische und wirtschaftliche Verhältnisse einiger schweizerischer und italienischer elektrischer Bahnen. Ising. (102) Apr. 15.
- Die Entwicklung der amerikanischen Hochspannungs-Gleichstrombahnen und die Systemfrage der elektrischen Zugförderung. W. Kummer. (107) Apr. 24.
- Die Berichtigung der Gleisbogen nach dem Vorschlage eines Amerikaners und das Ausgleichverfahren von Nalenz.\* Höfer. (102) May 1.
- Die Ausmauerung und Entwässerung im Tunnel.\* Gaber. (40) Serial beginning May 1.
- Die Anwendung der Lentz-Ventilsteuerung bei Lokomotiven und die dadurch zu erzielende Erhöhung der Leistungsfähigkeit.\* Eugen Pilz. (53) Serial beginning May 7.
- Elektrische Zugbeleuchtung.\* E. Rosenberg. (48) May 8.
- Vorbeugungsmassregeln bei Eisenbahnbauten im Rutschterrain.\* Michael v. Könyves-Tóth. (53) Serial beginning May 14.
- Erfahrungen mit Kugellagern im Betriebe der Rhätischen Bahn. A. Guhl. (107) May 27.
- Erfahrungen mit Eisenbetonschwellen. H. Amos. (78) June 3.
- Schlussbericht der Bauleitung über die Bauarbeiten der Chur-Arosa-Bahn.\* (107) Serial beginning June 12.
- Die Beanspruchung der Lokomotiv-Parallelkurbelgetriebe ohne und mit Stichmassfehler und Lagerspiel. W. Kummer. (41) June 24.
- Das Rollmaterial der schweiz. Eisenbahnen an der schweiz. Landesausstellung in Bern 1914.\* A. Ketler. (107) Serial beginning July 3.

**Railroads, Street.**

- Consideration with Regard to the Rapid Transit Problem in Cities. George F. Swain. (58) Apr.
- Baltimore Experience in Paving Street-Railway Tracks.\* Harry D. Williar, Jr. (13) May 6.
- Practice in Paving Street Railway Tracks.\* (13) May 6.
- Ontario Government Electric Railway Project. (96) May 6.
- Slice Method of Subway Construction, Boylston Street Subway, Boston, Mass.\* (18) May 8.
- Investment Required per Passenger. D. J. McGrath. (17) May 8.
- Telephone Despatching in City Service.\* Elmer E. Strong. (17) May 8.
- Track Work by Contractor or Way Department? S. Gausmann. (17) May 8.
- Power Reel for Cars, Trucks, etc.\* R. H. Parsons. (17) May 8.
- The New York Municipal Car-Brakes and Auxiliaries.\* (17) May 8.
- New Carhouse and Shops at Holyoke.\* (17) May 15.
- Traffic Characteristics.\* F. W. Doolittle. (17) May 15.
- Every Type of Subway Construction but Air Tunnel used on Harlem River Section. (14) May 15.
- Tri-City Railway Bearing Practice.\* John Sutherland. (17) May 15.
- Design of Steel Elevated Railways, N. Y. Rapid Transit System.\* Maurice E. Griest. (13) May 20.
- Derrick Car for Elevated Railway Reconstruction.\* J. M. Ryan. (13) May 20.
- Light-Weight Steel Interurban Car.\* (17) May 15.
- The Effects of Remote Feeder Taps on Schedule Speed.\* Nicholas Stahl. (17) May 22.
- Two-Car Trains at 25 Per Cent. Grade.\* (17) May 22.
- Portable Substation at Pittsburgh.\* (17) May 29.
- Track Construction in Paved Streets. B. R. Brown. (17) May 29.
- Track Reconstruction in San Antonio. G. W. Smith. (17) May 29.
- Low-Floor California-Type Car.\* W. B. Farlow. (17) Serial beginning May 29.
- Top Contact Unprotected Conductor Rail for 600-Volt Traction Systems.\* Charles H. Jones. (42) June.
- Laying New Track under an Old Elevated Railway Platform.\* (13) June 17.
- How Some Problems in the New York Elevated Improvement Work were Solved.\* (14) June 19.
- Rail Wear in Chicago.\* (17) June 26.
- Starting Six Tubes for Two New East River Subway Crossings in New York.\* (14) June 26.
- All-Steel Cars for London & Port Stanley Railway.\* (17) July 3.
- Light-Weight Car for Cleveland & Eastern Traction Company.\* (17) July 3.
- Subway Undercrossing Walls Concreted from the Top Down.\* (14) July 3.
- Design, Construction, and Detailed Costs of a Car Storage House in Council Bluffs, Iowa.\* W. L. Fulton. (86) July 14.
- Typical and Special Construction Used on Queens Extension to New York Elevated.\* (14) July 17.
- Hamilton Electric Incline Railway.\* (17) July 17; (13) July 8.

\* Illustrated.



**Railroads, Street—(Continued).**

- Steel Shields Protect Traffic During Removal of New York Subway Roof.\* (14) July 24.  
 Der Einbau von Strassenbahngleisen in Asphaltstrassen. C. Hörburger. (39) Serial beginning Mar. 5.

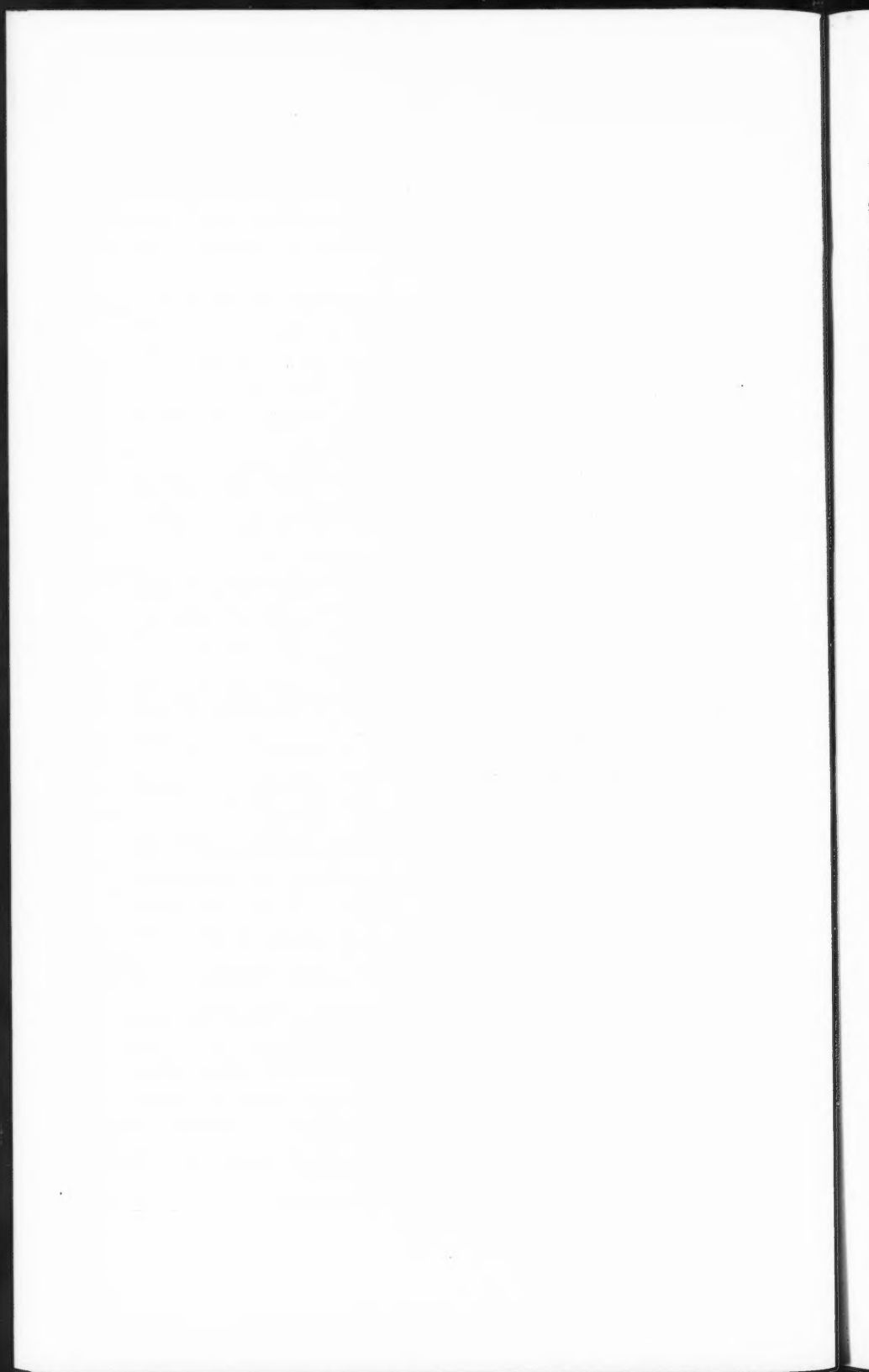
**Sanitation.**

- Methods of Treatment of Sewage Sludge. Peter Gillespie. (5) Vol. 28, Pt. 2.  
 A Magnet as a Surgical Instrument.\* (108) Mar.  
 Concrete Lined Channel of Paxton Creek, Harrisburg, Pa. Joel D. Justin. (98) Apr.; (14) July 24.  
 Notes on a System of Sanitary Sewers for Beaver Falls, Pa. Leo Hudson. (98) Apr.  
 Northwestern Electric's Heating System.\* F. O. Broili. (111) May 1.  
 Vacuum Heating Systems. W. L. Durand. (64) May 4.  
 A 90-In. Circular Gate for a 120-Ft. Head.\* (Sewerage System.) (13) May 6.  
 Drainage Problems in Saskatchewan. C. T. Lount. (96) May 6.  
 Heating and Ventilating a Factory Building.\* (101) May 7.  
 Sewage Disposal Methods in Rural Districts.\* (101) May 7.  
 Screw Pumps for the Drainage Works at New Orleans.\* (12) May 7.  
 Sewage-Treatment Plant at Calvert, Tex.\* Thomas L. Fountain. (13) May 13.  
 Heating and Ventilating Developments. A. H. Barker. (Paper read before the Society of Engineers.) (66) May 13; (47) May 21.  
 A 2 400 000-Yd. Drainage Letting: Work to Be Done in Polk County, Florida. (86) May 19.  
 Notes on the Design of Drainage Ditches, with Diagrams.\* W. H. Poe. (86) May 19.  
 Cobalt Lake Drainage Project: Methods Adopted for Dewatering Cobalt Lake and for Supplying with Water from Other Sources the Various Interests Which Formerly Pumped from Cobalt Lake.\* O. L. Flanagan. (96) May 20.  
 Water-Supply and Typhoid Fever at Cumberland, Md.\* Arthur G. Fowler and Max J. Colton. (13) May 20.  
 Construction of Storage Tanks in Peat. Harold N. Alves. (104) May 21.  
 Warm Air Heating for Suburban Residence.\* (101) May 21.  
 St. Louis Builds Large Swimming Pool.\* (101) May 21.  
 Use of Ozone in Air Purification. Milton W. Franklin. (Paper read before the American Society of Heating and Ventilating Engineers.) (101) May 21.  
 Design and Operation of Small Municipal Refuse Incinerator at International Falls, Minn.\* (86) May 26.  
 The Degree of Purification Desirable and Practicable in Sewage Treatment Plants in Iowa. (86) May 26.  
 Factory with Down Ventilation through Columns.\* (13) May 27.  
 Sewage-Treatment Plant for a Small Sanatorium.\* R. F. MacDowell. (13) May 27.  
 Garbage Reduction at Columbus, Ohio, 1913 and 1914. (13) May 27.  
 Glastonbury Sewage Works.\* A. P. I. Cotterell. (104) May 28.  
 Wealthy Californian's Swimming Pool de Luxe. (101) May 28.  
 Heating Rooms with Gas Burning Appliances. George S. Barrows. (Paper read before the American Society of Heating and Ventilating Engineers.) (101) May 28.  
 Comfort in a Country Mansion: Fresh Air Warmed by Indirect Hot Water Radiators Brings Salubrity In-Doors.\* (101) May 28.  
 Modern Design in House Drainage Systems.\* Andrew J. McGookin and William H. Cramer. (101) May 28.  
 Imhoff Tanks and Sprinklers for Sewage of Brighton District, Rochester, New York.\* (14) May 29.  
 Three Roofs Furnish More Dirt Than 4¼ Miles of Street.\* (14) May 29.  
 The Sewage Disposal Works at Fitchburg, Mass.\* David A. Hartwell. (109) June.  
 An Efficiency Test of a Shone Ejector Plant.\* C. S. Moore. (36) June.  
 Cost and Method of House Heating by Gas. F. R. Hutchinson. (Paper read before the Natural Gas Assoc.) (83) June 1; (101) July 2.  
 Plans for a Typical Condition of Mississippi Bottom Land Drainage.\* (86) June 2.  
 Scavenging in Urban Districts, a Local Government Board Return. (104) June 4.  
 Recommend Filtering Chicago Water and Progressive Disposal of Sewage. George and A. J. Martin. (14) June 5.  
 Devices and Methods Used in Various Localities in Measuring the Flow of Sewage.\* (86) June 9.  
 Design, Construction and Cost of New Sanitary Sewer System of Carrollton, Ill. M. C. Poulsen. (86) June 9.  
 Another Simple and Efficient Recording Gage for Weir Measurements.\* (Sewers.) David E. Adams and Earl I. Roberts. (13) June 10.  
 Sewage Disposal in Chilliwack.\* (96) June 10.  
 Sewage-Works of Morristown.\* Clyde Potts. (13) June 10.

---

\* Illustrated.



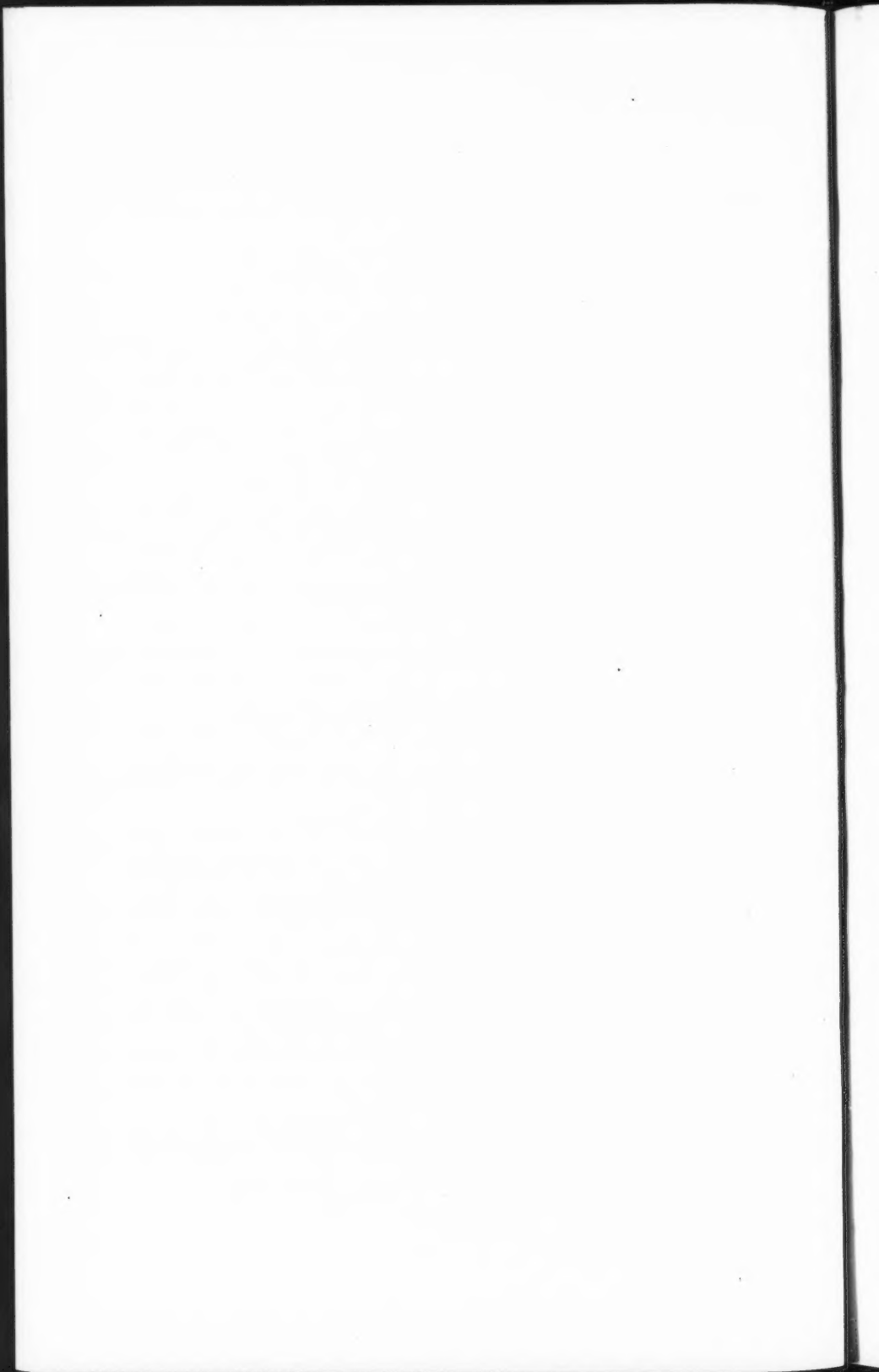


**Sanitation—(Continued).**

- The Fitting up and Working of a Sewage Works Laboratory.\* James H. Edmondson. (104) June 11.
- Theory and Practice in Warm-Air Heating. (101) June 11.
- Hidden Fixture Overflows a Menace. S. C. Fredericks. (101) June 11.
- Plumbing in Eastern District Y. W. C. A.\* (101) June 11.
- Remodeling of Septic Tanks into Imhoff Tanks Eliminates Odors from Land Irrigation.\* (14) June 12.
- Refuse Incinerator, Florence, S. C.\* McKean Maffitt. (13) June 17.
- Reinforced Concrete Sewer Viaduct.\* E. Dow Gilman. (13) June 17.
- Sydney Ocean Outfall Sewer.\* (104) June 18.
- Refuse Incinerator Guarantees are too Strict for Practical Fulfilment. (14) June 19.
- Reject Untried Sewage Treatment Methods for Decatur. (14) June 19.
- Methods and Results of Making Sewage Gagings at Berkeley, Calif.\* T. A. Bither. (From *Western Engineering*.) (86) June 23.
- Berlin Incinerator in Operation.\* (96) June 24.
- Riensch-Wurl Sewage Screens, Brooklyn.\* (13) June 24.
- Efficiency Ratings for Warm Air Furnaces.\* Arthur C. Willard. (Paper read before the National Warm Air Heating and Ventilating Assoc.) (101) June 25.
- Ozone an Aid to Factory Ventilation.\* V. D. Greene. (9) July.
- Philadelphia Street Cleaning by Contract. (13) July 1.
- Activated Sludge Experiments.\* R. O. Wynne-Roberts. (96) July 1.
- Constructing the Fitchburg Sewage-Works.\* Frank A. Marston. (13) July 1.
- Operating Records of Atlanta Sewage Treatment Plant Show Adequate Degree of Purification.\* Charles C. Hommon. (14) July 3.
- New Methods of Odor Elimination at Garbage Plants Indicated by New York Tests. Irwin S. Osborn. (Abstract of Report to Board of Estimate and Apportionment, New York City.) (14) July 3.
- A Summary of the Results of Experiments on the Purification of Creamery Refuse and Their Application. H. R. Crohurst. (86) July 7.
- Costs of and Profits from Tile Underdrains. (86) July 7.
- Design and Construction of the Arroyo de la Brea Storm Sewer System, Los Angeles, Cal.\* (86) July 7.
- Three Residential Sewage-Treatment Plants near Cleveland.\* R. F. MacDowell. (13) July 9.
- Destructors and Their By-Products. J. A. Priestly. (Abstract of paper read before the Inst. of Cleansing Supt.) (104) July 9.
- Design of Greenhouse Heating Plants.\* Philip McKee. (101) July 9.
- District Heating with Open Heater.\* Thomas Wilson. (64) July 13.
- Activated-Sludge Experiments at Milwaukee, Wis.\* T. Chalkley Hatton. (13) July 15.
- Practical Application of the Saltpeter Method for Determining the Strength of Sewages. Arthur Lederer. (Paper read before the Am. Public Health Assoc.) (96) July 15.
- Digging a Subway to Build a Sewer.\* (76) July 20.
- Activated Sludge in America.\* M. N. Baker. (13) July 22.
- Automatic Device Controls Hypochlorite Application.\* E. E. Ludwick. (14) July 24.
- Hygiène de l'Habitation de l'Habitation; de l'Extraction de l'Humidité Originelle ou de Construction dans les Batiments ou Locaux Nouvellement Construits au Moyen du Froid Artificiel. A. Knapen. (32) July.
- Vorhandene Fallrohre bei modernen Abortanlagen.\* Otto Spiegelberg. (7) Jan. 9.
- Wasserversorgung und Typhusausbruch in Centralia, Washington.\* E. R. Kelley and S. Macomber. (112) Jan. 16.
- Die Klagen über unsere Zentralheizungen für Mietshäuser. Otto Ginsberg. (7) Jan. 16.
- Der Krankenhausbau auf der Baufach-Ausstellung in Leipzig 1913.\* C. Guillery. (7) Jan. 16.
- Die Klärung und Reinigung der städtischen Abwässer.\* P. Rohland. (39) Jan. 20.
- Ueber die Wirkung von Regenauslässen und Regenwasserbecken in städtischen Kanalisationen.\* Engberding. (39) Serial beginning Jan. 20.
- Reinigung der Abfallwasser in Hilversum (Niederlande).\* (7) Jan. 23.
- Bericht über die Arbeiten der Lüftungsabteilung des Gesundheitsamtes in Chicago im Jahre 1913. E. Vernon Hill. (7) Feb. 6.
- Benutzung der Gezeitenbewegung zur Entwässerung von Poldern.\* A. v. Horn. (40) Feb. 13.
- Die Lüftung der Kesselräume. Alex. Marx. (7) Feb. 13.
- Die Feuchtigkeit der Luft. Otto Marr. (7) Serial beginning Feb. 13.
- Fussboden- und Wandheizung nach Art altrömischer Heizanlagen in dem Neubau eines Hauses für chirurgische Behandlung beim Lazarett in Wiesbaden.\* (7) Feb. 20.
- Absturzbauwerke bei Stadtentwässerungen.\* Schubert. (7) Feb. 20.
- Fahrbare Desinfektionsapparate im Kriege.\* F. A. Ebert. (7) Feb. 20.

---

\* Illustrated.



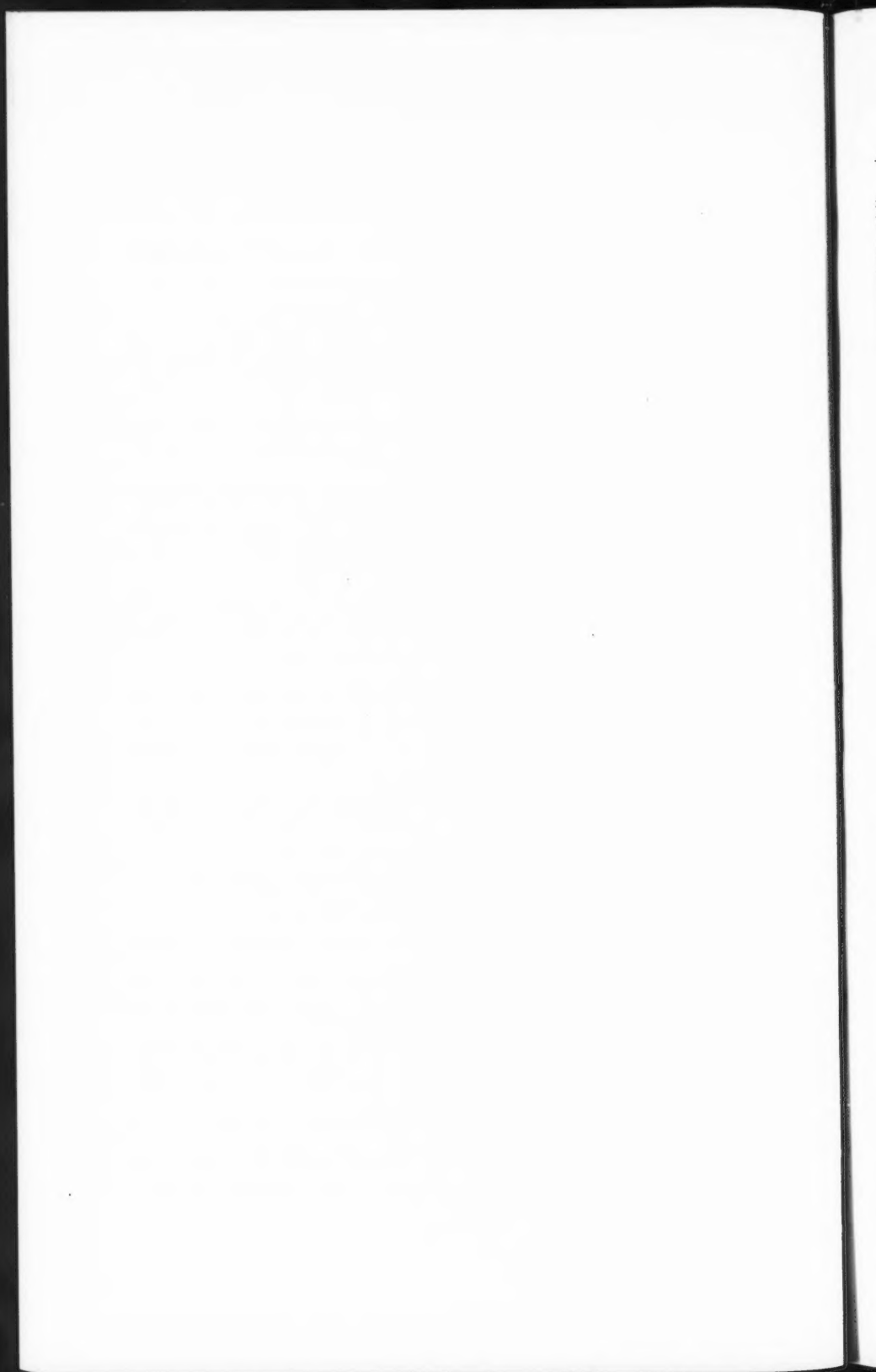
**Sanitation—(Continued).**

- Die Schlamm-trocknungsanlage zu Frankfurt a. M.\* Herm. Schaefer. (7) Serial beginning Feb. 27.
- Die Auswandererhallen der Hamburg-Amerika Linie, eine sanitäre und soziale Schöpfung, unter besonderer Berücksichtigung ihrer technischen Einrichtungen.\* Endris. (7) Mar. 20.
- Die Einführung von Heizprämien im Zentralheizungs-betrieb.\* C. A. Gullino. (7) Mar. 27.
- Muffendichtung bei Steinzeugrohren.\* Julius Barth. (7) Mar. 27.
- Die Grosse der Sammelbehälter von Pumpanlagen.\* Schleckel. (7) Mar. 27.
- Die Durchführung der Brauchwasserkanalisation in kleinen Gemeinden, insbesondere in den nicht kanalisierten Vororten Berlins; ein Beitrag zur Beurteilung des Trennsystems.\* Adolf Neuber. (7) Serial beginning Apr. 3.
- Die neue Desinfektionsanlage der Festung Krakau.\* F. A. Elbert. (7) Apr. 17.
- Ueber den Wärmedurchgang durch ausgeführte Bauten. Osc. Knoblauch. (7) Apr. 24.
- Die elektrische Heizung und das Schoopsche Metallspritzverfahren.\* Lach. (41) June 3.
- Die Verluste elektrisch geheizter Wärmespeicher.\* Ad Retterhausen. (41) June 17.

**Structural.**

- The Mechanical Action of Reinforced Concrete Floor Slabs and Columns, as Interpreted by the Character of the Deformations Under Load, and the Theory of Work.\* C. A. P. Turner. (5) Vol. 28, Pt. 2, 1914.
- The System of Unit Concrete Construction as Applied to the Power Buildings at Cedars, Que. John E. Conzelman. (5) Vol. 28, Pt. 2, 1914.
- Protection of Steel from Locomotive Gases.\* (15) Mar. 18.
- Protection of Metal Structures.\* Frederic H. Fay. (58) Mar.
- The Concrete Atomizer.\* (15) Mar. 19.
- A Simple Method of Securing Dustless Concrete Floors. P. M. Bruner. (Paper read before the Oregon Soc. of Engrs.) (1) Apr.
- Wind Stresses in the Steel Frames of Office Buildings.\* Albert Smith and Wilbur M. Wilson. (4) Apr.
- Corrosion of Iron and Steel. W. J. E. Binnie. (Paper read before the Inst. of San. Engrs.) (104) Apr. 23.
- An All-Concrete Barn. E. S. Fowler. (67) May.
- Local Sands and Gravel as Aggregates in Concrete.\* F. M. McCullough. (58) May.
- Effect of Fineness of Sand and of Clay and Loam on the Strength of Mortar.\* F. L. Roman. (86) May 5.
- The Structural Features of a 435-Ft. Tower, Panama-Pacific Exposition.\* Frank S. M. Harris. (13) May 6.
- Settlement of Two Grain Elevators.\* (13) May 6.
- Diagram for Net Section of Riveted Tension Members.\* (13) May 6.
- An Explanation of Some Common Painting Troubles.\* Gustave W. Thompson. (Abstract of paper read before the Maintenance of Way Master Painters' Association.) (13) May 6.
- G. T. R. Windmill Point Elevator Annex, Montreal.\* (96) May 6.
- A Gasholder Without a Water Tank.\* (66) May 11.
- Chimneys for Oil and Coal-Burning Plants. F. H. Rosencranz. (64) May 11.
- A Mast and Boom Concreting Plant.\* R. C. Hardman. (86) May 12.
- Paving for Piers, Warehouses and Garages.\* (13) May 13.
- High-Pressure Steam Test for Portland Cement. R. J. Wig and H. A. Davis. (13) May 13; (14) May 22.
- Public-Comfort Station Built in Salt Lake City, Utah.\* Sylvester Q. Cannon. (13) May 13.
- Ice Houses and Their Equipment.\* (23) May 14.
- Some Notes on Wind Pressure. R. Graham Keavill. (Paper read before the Concrete Institute.) (57) May 14.
- Structural Members as Concrete Stiffener.\* Charles C. Lynde. (62) May 15.
- Strength Tests of Reinforcement Types.\* (62) May 15.
- Expansion and Contraction of Concrete Building Measured.\* (14) May 15.
- The Designing of Reinforced Concrete Slabs Subjected to Bending and Compression.\* Anders Bull. (86) May 19.
- Unit Costs of, and Organization for, Building Site Excavation. W. W. Hay. (86) May 19.
- Burnt Clay as Concrete Aggregate.\* (86) May 19.
- Design and Construction Features of the Palmer Memorial Stadium, Princeton, N. J.\* (86) May 26.
- Factory with Down Ventilation through Columns.\* (13) May 27.
- Test of Load-Distributing Action of Floor Arches.\* Frank N. Kneas. (13) May 27.
- Stresses in a Rigid Frame of Two Columns and a Truss (Orpheum Theatre).\* Felix Freyhold. (13) May 27.

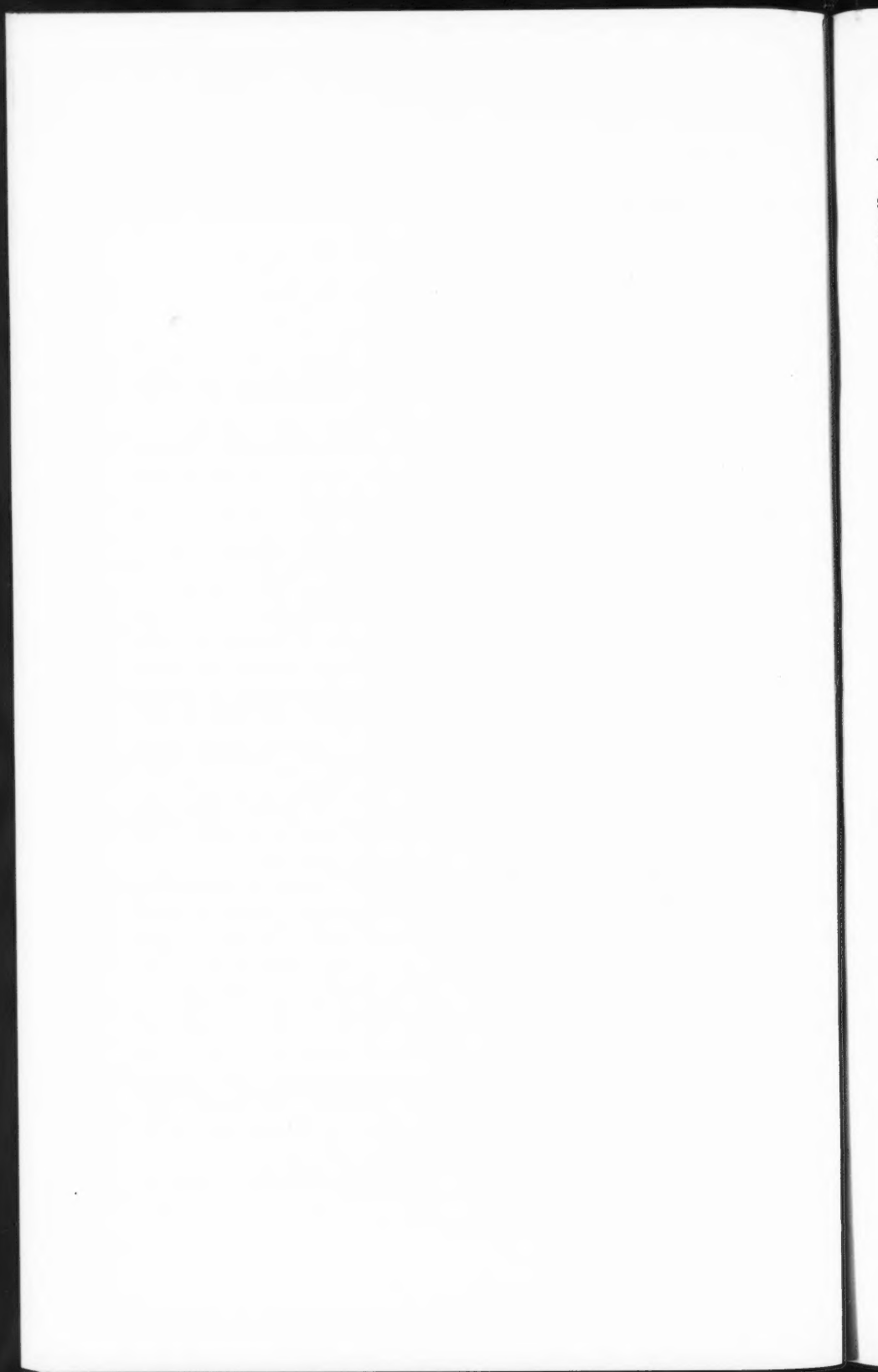
\* Illustrated.



**Structural—(Continued).**

- Lime Concrete in the East. E. A. W. Phillips. (Abstract of paper read before the Concrete Inst.) (104) May 28.  
 Flat Skylight on Structural Steel Frame. (101) May 28.  
 Fifteen Hundred-Ton Country Club Moved 1200 Feet.\* (14) May 29.  
 Wind Pressure.\* (21) June.  
 Portable Concrete Railway Buildings.\* A. M. Wolf. (87) June.  
 A Study of Some Curious Painting Phenomena.\* Henry A. Gardner. (3) June.  
 A Brick Chimney Which Floats.\* (64) June 1.  
 Test of a Peculiarly Designed Concrete Slab.\* (13) June 3.  
 Steel Frame for a Large Electric Sign.\* (13) June 3.  
 Influence of Composition on the Corrosion of Steel. Leslie Aitchison. (Abstract of paper read before the Faraday Soc.) (47) June 4.  
 Heavy Trusses and Foundation Girders used in Steel Bank Building; Clear Bank Floor and Cleveland Building Code Requirements Govern Structural Arrangement of Thirteen-Story Building.\* (14) June 5.  
 Curves for Strength and Deflection of Very Long Columns.\* (13) June 10.  
 Laying Galvanized Corrugated Roofing Sheets.\* E. Stern. (101) June 11.  
 The Economic Side of Sand Testing.\* Cloyd M. Chapman and Nathan C. Johnson. (14) June 12; (14) June 9.  
 Removal of Rust with Chemical Reagents.\* J. Newton Friend and C. W. Marshall. (62) June 15.  
 Jacking out Sheetpiles with a Friction Clamp. (13) June 17.  
 Foundations for High Towers at Darien.\* Ira W. Dye. (13) June 17.  
 B. R. & P. Concrete Sign and Post Plant.\* (15) June 18.  
 Torsional Strengths of Guy Anchor Rods.\* Terrell Croft. (27) June 19.  
 Safe Concrete Demands Knowledge of Nature of Sands.\* Cloyd M. Chapman and Nathan C. Johnson. (14) June 19.  
 Design and Construction of the Chicago Hebrew Institute, a Reinforced Concrete Structure Possessing Unusual Features.\* (86) June 23.  
 Cotton Warehouse and Terminal at New Orleans.\* (13) June 24.  
 A Large Gravel-Washing Plant.\* (13) June 24.  
 Nomographic Charts for Simple Beam Design.\* Charles D. Conklin, Jr. (14) June 26.  
 Quality of Concrete Controlled by Tests of Sand. Cloyd M. Chapman and Nathan C. Johnson. (14) June 26.  
 Results of Some Tests to Determine the Effect of Various Elements in Steel on Its Resistance to Corrosion. Daniel M. Buck. (Paper read before the Am. Iron and Steel Inst.) (86) June 30; (101) June 18; (62) June 1; (20) June 3.  
 Stress Distribution in Materials. E. G. Coker. (Paper read before the British Assoc. for the Advancement of Science.) (21) July.  
 Treatment of Concrete Surfaces. Albert M. Wolf. (87) July.  
 Metal Spray Processes in Engineering and Art.\* John Calder. (55) July.  
 Tests of Piles in Sand Beach, Atlantic City, N. J.\* Fred W. Abbott. (13) July 1.  
 The Graphical Design of Shear and Press Frames.\* Axel K. Pedersen. (72) July 1.  
 Testing the Hardness of Iron Castings.\* G. S. Evans. (20) July 1.  
 A Reinforced Brickwork Retaining Wall.\* (12) July 2.  
 The Testing of Building Stone in Canada. Wm. A. Parks. (Report to the Canadian Dept. of Mines.) (12) July 2.  
 Change in the Density of Mild Steel Strained by Compression Beyond the Yield-Point.\* F. C. Lea and W. Norman Thomas. (11) July 2.  
 Construction Work on the Traymore Hotel, Atlantic City.\* (13) July 8; (14) July 3.  
 Corrosion of "Pure Irons" and Steel used by U. S. Reclamation Service. I. C. Harris. (From *Reclamation Record*.) (13) July 8.  
 Loading Test of Lagged Piles in Soft Silt.\* C. W. Staniford. (13) July 8.  
 Design of Rectangular Concrete Beams.\* (96) July 8.  
 Economy in the Design of Reinforced Concrete Columns.\* Percy J. Waldram. (12) July 9.  
 Reinforced-Concrete Frame of Hotel Traymore, Erected at Rate of a Floor a Week.\* (14) July 10.  
 Forest Service Proposes Grading Rule for Southern Yellow Pine. (14) July 10.  
 Some Data on Wood Frame and Reinforced Concrete Ice Storage Houses. (Abstract from Report of Committee of the Am. Ry. Bridge and Bldg. Assoc.) (86) July 14.  
 Framing of the Dome of the Palace of Horticulture.\* A. W. Earl and Thos. F. Chace. (13) July 15.  
 Cincinnati Buildings Suffer from Wind Storm.\* (13) July 15.  
 4½ Miles of Concrete Fence Flank Transit Route.\* (14) July 17.  
 Jersey Central Service Buildings at Jersey City Have Several Novel Features.\* (14) July 17.

\* Illustrated.

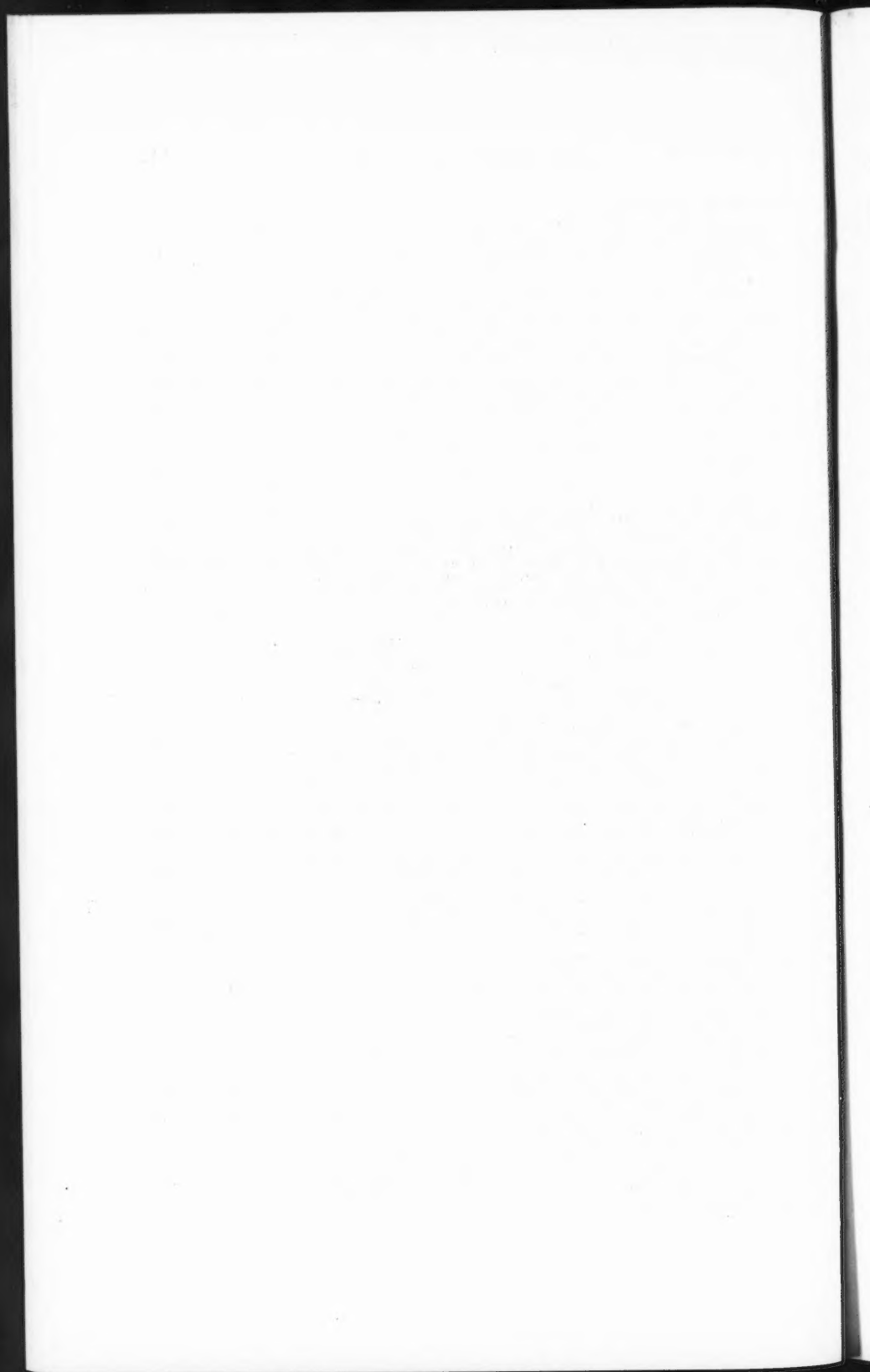




**Structural—(Continued).**

- A Tornado-Proof Roof.\* (76) July 20.  
 Comparative Building Costs. (From the *Building Age*.) (76) July 20.  
 New Morrison Hotel Plant.\* Thomas Wilson. (64) Serial beginning July 20.  
 Reinforced-Concrete Cap of Perry Memorial Column.\* Howard C. Baird. (13) July 22.  
 Les Variations des Propriétés Mécaniques des Produits Métallurgiques en Fonction de la Température.\* L. Guillet. (32) July, 1914.  
 Essais de Dureté Exécutés avec un Appareil à Main.\* F. Turpin. (93) Feb.  
 L'Influence de la Coalescence sur les Propriétés Mécaniques des Alliages.\* A. Portevin et V. Bernard. (93) Mar.  
 Sur un Exemple de Fragilité Persistante dans un Acier.\* V. Bernard et A. Portevin. (93) Mar.  
 Influence de l'Allotropie sur la Métastabilité des Métaux, sa Signification en Chimie, Physique et Technique.\* Ernst Cohen. (93) Mar.  
 Die Bestimmung des Mischungsverhältnisses von erhärtetem Mörtel oder Beton. H. Nitzsche. (49) Pt. 4.  
 Ueber Versuche mit Steinerhaltungsmitteln.\* F. Rathgen. (49) Pt. 4.  
 Das Presszement-Bauverfahren.\* August Wolfsholz. (51) Serial beginning Sup. No. 8.  
 Bestimmung des Grades der Statischen Unbestimmtheit bei Rahmensystem. (51) Sup. 10.  
 Die Berechnung von Pfahlrost-Gründungen.\* Max Buchwald. (51) Sup. 10.  
 Neues Verfahren zur raschen Ermittlung der Abmessungen und Eiseneinlagen von Gewölbefugen.\* R. Färber. (51) Sup. No. 11.  
 Der Bismarckturm bei Leipzig.\* Haimovici, Obering, und Prok. (51) Sup. 11.  
 Falsche Auslegung des § 14 Absatz 5 der preuss. Bestimmungen für Eisenbeton bei Hochbauten vom 24 Mai 1907.\* V. Lewe. (51) Sup. 12.  
 Versuche über die Tragkraft von Säulen aus Gussbeton mit verschiedenen Querschnitten und Bewehrungen.\* (51) Sup. 12.  
 Der Eisenbeton im Wettbewerb um die Obst- und Gemüse-Grossmarkthalle für Berlin.\* (51) Sup. 12.  
 Berechnung von Vierendeelträgern mit Hilfe des Verfahrens der Starren Ersatzstäbe.\* Wolfgang Freiherr zu Putlitz. (69) Serial beginning Dec. 1914.  
 Berechnung von Betonkuppeln.\* Doorentz. (80) Serial beginning Jan. 9.  
 Eisenerne Spundbohlenform "Rote Erde".\* Range. (40) Jan. 23.  
 Theorie des Schallüber- und Durchgangs.\* Richard Berger. (7) Serial beginning Jan. 30.  
 Einsturz einer Eisenbetonhalle.\* (80) Jan. 30.  
 Der Dreifeldrige Rahmen mit Gleichen Endfeldern und mit Eingespannten, Bzw. Gelenkig Gelagerten Ständern.\* Leopold Herzka. (69) Feb.  
 Eisenbauten der Gegenwart; Erläuterungen von Eisenhochbauten, ausgeführt von Steffens & Nölle A.-G., Berlin-Tempelhof und Essen-Ruhr.\* H. Bock. (69) Feb.  
 Verstärkung der Gründung eines Durchlasses durch Pressbetonpfähle.\* Koll. (40) Feb. 10.  
 Unbeschränkte Zulassung von Eisenportlandzement zu öffentlichen Bauten. (80) Feb. 16.  
 Eisenbeton-Stützmauer.\* F. Knispel. (80) Serial beginning Feb. 16.  
 Das Verhalten von Guss (Konkret-) betonbauten in Feuer.\* Wendt. (40) Feb. 20.  
 Zur Berechnung eines Bunkers.\* W. L. André. (69) Mar.  
 Spannungszustand und Formänderung eines exzentrisch gedrückten Stabes bei Geltung eines nicht linearen Formänderungsgesetzes. Martin Grüning. (40) Mar. 3.  
 Zerstörungen an Zementmörtel durch gewöhnliches Wasser.\* H. Segel and E. Cramer. (80) Mar. 27.  
 Beitrag zur Berechnung der Rahmenträger.\* Otto Mohr. (40) Serial beginning Mar. 31.  
 Schlachthofkühlräume und Gefrierräume zur Aufbewahrung von Fleischvorräten.\* F. Moritz. (39) Apr. 5.  
 Fasertorf als Baumaterial. Guntram Mahir. (39) Apr. 5.  
 Ueber die Tränenbildung des Hausschwammes.\* Moorman. (40) Serial beginning Apr. 14.  
 Die Kerbschlagprobe und das Aehnlichkeitsgesetz. R. Stribeck. (50) Apr. 15.  
 Der Neubau des städtischen Wehramtes in München.\* Hans Grässel. (51) Serial beginning Apr. 17.  
 Küchlin's Variété-Theater in Basel.\* Widmer, Erlacher, und Calini. (107) Apr. 17.  
 Der Wettgewerb für Vorentwürfe zum Neubau der Berliner Grossmarkthalle.\* (40) Serial beginning Apr. 21.  
 Das Verhalten des Betons gegen Meerwasser. P. Rohland. (40) Apr. 28.  
 Mitteilungen über das neue Geschäftsgebäude der Generaldirektion der Kgl. Württemberg Staatseisenbahnen in Stuttgart.\* Martin Mayer. (7) May 1.  
 Berechnung einer Eisenbetontreppe.\* Fr. Schrader. (78) May 3.

\* Illustrated.



**Structural—(Continued).**

- Bericht des Trägertypen-Ausschusses.\* C. Halberkalt. (53) May 21.  
 Vergleichende Versuche mit dem Amsler-Laffonschen Fallwerk und einem neuen kleinen Pendelhammer von 25 mkg Arbeitsinhalt von Mohr & Federhaff in Mannheim.\* A. Schmid. (48) May 22.  
 Das neue Verwaltungsgebäude der chemischen Fabrik von E. Merck in Darmstadt.\* Steinberger. (78) June 3.  
 Der Schutz des Eisens durch Beton gegen Rost.\* W. P. Muller. (78) June 3.  
 Zur Berechnung kontinuierlicher Träger unter Berücksichtigung der Voutenwirkung.\* Paul Kaufmann. (78) June 3.  
 Weitere Untersuchungen von Eisenbetonsäulen.\* M. Rudeloff. (78) June 3.  
 Das neue Rathaus in Kiel.\* Hermann Billing. (51) Serial beginning June 5.  
 Der einsteilige Rahmen mit und ohne Kragarm.\* Robert Gsell. (107) June 5.  
 Einiges über den evangelischen Kirchenbau.\* (53) Serial beginning June 11.  
 Die Festigkeit und Wasseraufnahme der Kalksandsteine (Hydrosandsteine).\* A. Leon und H. Linser. (53) July 2.  
 Die neue Hauptpost in St. Gallen.\* (107) July 3.

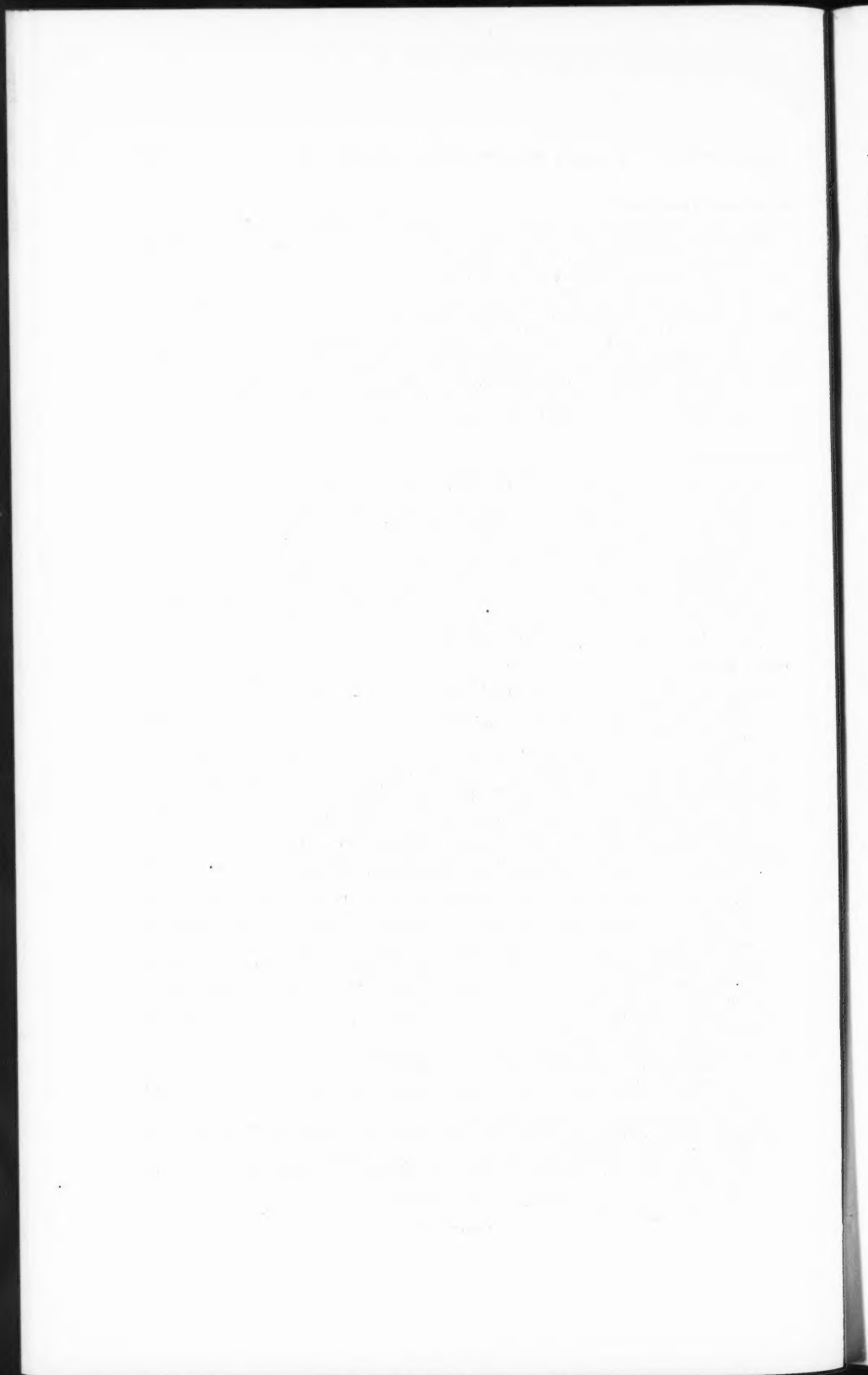
**Topographical.**

- Preliminary Estimating of Grading Simplified.\* J. Maughs Brown. (14) May 15.  
 A Simple Method of Cross-Sectioning Employed on Ditch Work.\* Benjamin L. Parker. (86) May 19.  
 New Smith Solar Attachment.\* Arthur D. Kidder. (13) June 3.  
 Topographic Surveys for Logging Operations.\* Earl A. Marshall. (13) June 10.  
 Stadia Surveys. Rupert Neelands. (Paper read before the Dominion Land Surveyor's Assoc.) (96) June 24.  
 Some Examples of Stadia Surveying and Its Broader Uses with Special Reference to Preliminary Hydraulic Surveys. W. B. Saunders. (Paper read before the Minnesota Surveyors' and Engrs.' Soc.) (86) June 30.  
 New Hydrographic Signal of the U. S. Coast and Geodetic Survey.\* (13) July 1.  
 Notes on Plane Table Work. C. R. Westland. (Paper read before the Dominion Land Surveyors' Assoc.) (96) July 8.

**Water Supply.**

- Making Our Water Powers Valuable.\* Arthur Surveyer. (5) Vol. 28, Pt. 2, 1914.  
 Pumping and Other Machinery for Water-Works and Drainage.\* William B. Bryan. (75) Oct., 1914.  
 The South's Hydraulic Development and What It Means from an Industrial Standpoint.\* (108) Mar.  
 Pipe Couplings. R. S. Lord. (58) Apr.  
 Thorne and District Waterworks.\* F. Graham Fairbank. (104) Apr. 23.  
 The Brooks Aqueduct, Alberta.\* H. M. Gibb. (11) Apr. 23.  
 Ground Water Supplies.\* William S. Johnson. (109) May; (96) May 20.  
 The Kennedy Dam.\* John S. Eastwood. (103) May 1.  
 Design and Methods and Cost of Constructing the Los Angeles City Trunk Line, Connecting Aqueduct to Distribution System.\* B. A. Heinly. (86) May 5.  
 Combined Turnout and Drop for Irrigation Canals.\* (86) May 5.  
 Methods and Costs of Lining Irrigation Canal with Toncan Metal. E. M. Chandler. (Abstract of paper read before the Washington Irrigation Institute.) (86) May 5.  
 Automatic Check Gate Structure for Turlock Irrigation District, California.\* (86) May 5.  
 The Valuation of Water Works Properties. Halbert P. Gillette. (86) Serial beginning May 5.  
 Automatic Control Apparatus for Hydraulic Gate Valves. (86) May 5.  
 A Device for the Protection of Public Water Supplies against Pollution through Connection with Industrial Supplies.\* (86) May 5.  
 What an Engineer Should Know about Water Rights. Morris Bien. (86) May 5.  
 Measurement of Stream Flow in Ontario.\* (96) May 6.  
 Repairing and Waterproofing the Nashville Water-Works Reservoir.\* W. W. Southgate. (13) May 6.  
 Use of Liquid Chlorine at Buffalo Water-Works Intake.\* (13) May 6.  
 Water Coagulation, Sedimentation and Aeration Plant at Norristown, Penn.\* S. Cameron Corson. (13) May 6.  
 Stripping Water-Works Reservoirs.\* Allen Hazen and Geo. C. Whipple. (13) May 6.  
 A Unique Water-Supply.\* (13) May 6.  
 Operations of the Cincinnati Water-Filtration Plant for 1914.\* J. W. Ellms. (13) May 6; (13) May 20.  
 A Graphic Recorder for the Cole Pitometer.\* (13) May 6.  
 Grouting Equipment for City Tunnel, Catskill Aqueduct.\* Walter E. Spear. (13) May 6.  
 Water Powers in British Columbia. (96) May 6.

\* Illustrated.



**Water Supply—(Continued).**

- The Duxbury Reinforced-Concrete Water-Works Tank.\* (13) May 6.  
 A Test of Filter-Rate Controllers.\* Edward E. Wall and Gurdon G. Black. (13) May 6.  
 The Second Rebuilding of the Water-Works of Montrose. P. W. Pinkerton. (13) May 6.  
 Hydroelectric Developments in New Zealand.\* (12) May 7.  
 The City Reservoir, Regina.\* R. O. Wynne-Roberts. (104) May 7.  
 Cincinnati Builds High-Pressure Fire Service System.\* J. A. Hiller. (14) May 8; (13) July 22.  
 The Facts Concerning Los Angeles Aqueduct Water Case. F. C. Finkle. (111) May 8.  
 Home-Made Alum Airlift Eliminates Pump Corrosion.\* (14) May 8.  
 Dry-Feed Apparatus Solves Ithaca's Coagulant Problem; Helical Conveyor with Four Sets of Gears for Variable Speed Regulation Installed at City Filters.\* Henry N. Ogden. (14) May 8.  
 Baltimore Filters Abound in Useful Hints on Concrete Construction and Design; Wet Concrete Hindered Screeding on Slopes, Steel Forms at First Caused Trouble but Gave Satisfaction when Remodeled, Cypress Strips Used at Joints. James W. Armstrong. (14) May 8.  
 Low-Lift Centrifugal Pumps at Akron Will Operate Under Unusually Varied Conditions; Shop Tests Show 79.6 Per Cent. Efficiency for New Filter Plant, Single Stage Unit to be Driven by Electric Motor or Steam Turbine.\* F. A. Barbour. (14) May 8.  
 Brass Screen between Sand and Gravel Eliminated in Cincinnati Filter Reconstruction; Breaks Caused by Corrosion Necessitated Frequent and Costly Repairs, New Plan Uses Graded Layer of Heavier Gravel without Screen.\* J. W. Ellms. (14) May 8.  
 Columbus Waterworks Makes its own Alum, a Revolutionary Step in Water Purification Practice.\* Charles P. Hoover. (14) May 8.  
 America's First Large Direct-Explosion Pump will Irrigate Texas Lands; Unit under Construction at Del Rio will have Capacity of 28 000 Gallons per Minute against 37-Foot Head.\* (14) May 8.  
 Direct Control over Construction Materials is Feature of 100-Mile Winnipeg Aqueduct.\* (14) May 8.  
 New Sedimentation Basin will Halve Costs of Sand Cleaning at Philadelphia Filters; Turbidity Load on Torresdale Plant will be Greatly Relieved, Algae Growths Prevented and Output of Filtered Water Considerably Increased.\* Francis D. West. (14) May 8.  
 Meter Maintenance Systematized by Waterworks Department in Milwaukee; Day Flushing Causes Sand to Deposit in Meters, Motor Truck Maintenance Costs Warrant Replacing of Horse-Drawn Service Vehicles.\* (14) May 8.  
 End Pressure Broke 60-Inch Cast-Iron Water Main in Cincinnati.\* (14) May 8.  
 Hill-Tripp Centrifugal Pumps.\* (64) May 11.  
 New Jersey Supreme Court Upholds Decision Awarding Damages for Illness Contracted from Drinking Impure Water Supply. (86) May 12.  
 Some Practical Suggestions and Data on the Installation and Operation of Air Lift Pumping Systems. C. M. Wetherill. (86) May 12.  
 Extensive Development in Newfoundland. (96) May 13.  
 Underflow Water-Supply at Moline, Kan. W. L. Benham. (13) May 13.  
 Drilling 30-In. Wells for Irrigation.\* (13) May 13.  
 Catenary Reinforced Concrete Flume.\* H. M. Gibb. (62) May 15.  
 The Bombay Hydro-Electric Scheme.\* Alfred Dickinson. (77) May 15.  
 Water-Tank Controlling Device.\* (64) May 18.  
 An Ornamental Well House at Waterloo, Iowa.\* (86) May 19.  
 Methods of Plaster Lining Irrigation Canals and Laterals, Okanogan Project, U. S. Reclamation Service. (86) May 19.  
 Kensico Dam Construction in 1914.\* Wilson Fitch Smith. (13) May 20.  
 Water-Supply and Typhoid Fever at Cumberland, Md.\* Arthur G. Fowler and Max J. Colton. (13) May 20.  
 New Power Plant has Highest Head in New England.\* (14) May 22.  
 Arch Reinforced-Concrete Conduits Designed by the Theory of Least Work.\* Walter M. Smith. (14) May 22.  
 Seattle Municipal Dam Blunder. (111) May 22.  
 Study of a Water Supply by Pumping for Concrete Road Construction.\* (86) May 26.  
 Data on the Cost of Installing Small Water Works Systems in Massachusetts.\* Harry R. Crohurst. (86) May 26.  
 The New Austin Dam and Power Plant.\* Frank S. Taylor. (86) Serial beginning May 26.  
 Partridge Island Water Supply, St. John, N. B.\* F. G. Goodspeed. (96) May 27.  
 Slow Sand Filtration of Water. Joseph Race. (96) May 27.  
 Multiple-Arch Diversion Dam at Three Miles Falls, Oregon.\* H. D. Newell. (13) May 27.  
 Standard Gate Valves of the New York City Water-Works.\* (13) May 27.

\* Illustrated.



**Water Supply—(Continued).**

- Concrete Tanks on the Baltimore & Ohio.\* (23) May 28.  
 A Roughing Filtration Plant.\* (12) May 28.  
 Do Cylinder Gates Increase Turbine Efficiency? H. Birchard Taylor. (14) May 29.  
 Boiler Water and its Treatment.\* C. M. Young. (45) June.  
 Fertilizing Bottom Lands with Flood Water. Kenneth C. Grant. (98) June.  
 Some Features of the Ontario Statutes and Their Administration Affecting Water Supplies and Sewerage Systems. F. A. Dallyn. (59) June.  
 The Choice of Alloys for Water Work Design. Horace Carpenter. (59) June.  
 Studies of Artesian Waters in Chicago and Surrounding Territory.\* Carl B. Anderson and F. W. DeWolf. (59) June.  
 Cooled Drinking Water. R. F. Massa. (59) June.  
 Treatment of Water for Locomotive Use. W. A. Pownall. (59) June.  
 Kinks in the Control of Hypochlorite at Denver.\* W. W. De Berard. (59) June.  
 The Possibility of an Improved Water from Deep Wells in Northern Illinois. C. B. Williams. (59) June.  
 The Water Supply of Longview, Texas. P. E. Green. (59) June.  
 Bubbly Creek Filter Plant Adopts Liquid Chlorine Treatment. C. A. Jennings. (59) June.  
 Experiences in Rebuilding and Reenforcing a Water Works System. O. T. Smith. (59) June.  
 Experience with Artesian Well Water at Elgin, Illinois. R. R. Parkin. (59) June.  
 River Sand as a Filter Medium. L. A. Fritze. (59) June.  
 Wash Water Salvage at Champaign and Urbana. Harold E. Babbitt. (59) June.  
 Waste Prevention by Individual Meters Versus District Meters. R. O. Wynne-Roberts. (59) June.  
 Illinois Utilities Commission and the Water Works Companies. C. S. Bennett. (59) June.  
 Hydro-Electric Power in New Zealand.\* W. Wilson. (9) June.  
 Filtration Plant, City of Decatur, Illinois.\* Harry Ruthrauff. (59) June.  
 The New Filtration Plant at Quincy, Illinois.\* W. R. Gelston. (59) June.  
 The Standpipe at Westerly, R. I.\* Thomas McKenzie. (28) June.  
 Attleboro's Reinforced Concrete Standpipe. H. F. Conant. (28) June.  
 Concrete Standpipes.\* (Topical Discussion before the New England Water Works Assoc.) (28) June.  
 The Greenfield Water Works.\* George F. Merrill. (28) June.  
 A Description of the Water Supply System of Cohasset, Mass.\* D. N. Tower. (28) June.  
 Ultra Violet Rays for Water Purification.\* H. M. von Recklinghausen. (28) June.  
 First Cost and Cost of Operation of Irrigation Pumping Plants. (86) June 2.  
 Method and Cost of Lining an Irrigation Canal with Concrete. (86) June 2.  
 Transmission Losses in Unlined Irrigation Channels.\* Samuel Fortier. (13) Serial beginning June 3.  
 Concreting the Spaulding Dam.\* (13) June 3.  
 Placing the Milwaukee Water-Works Intake Crib.\* Roland E. Stoelting. (13) June 3.  
 Reconstruction of Austin (Texas) Masonry Dam.\* Frank S. Taylor. (13) June 3; (14) May 29.  
 Engineering in Mesopotamia.\* (11) June 4.  
 The Value of Mechanical Filters in the Purification of Water. Thomas Orr. (Abstract of paper read before the Royal San. Inst.) (104) June 4; (96) July 8.  
 San Diego Must Save all Available Water. (14) June 5.  
 Hydroelectric Development at Austin, Tex.\* (27) June 5.  
 Meters Cut Omaha's Water Consumption 20 Per Cent.\* (14) June 5.  
 Irrigating "The Land of Little Rain"; Policies and Rates Which Have Developed the 45 000-Hp. Electric Pumping Load of the Southern California Edison Company.\* S. M. Kennedy. (27) June 5.  
 The Distillation of Water.\* G. W. McKee. (Paper read before the Southern Gas Assoc.) (24) June 8; (83) July 1.  
 Design Features of the New Water Works at South Orange, N. J. (86) June 9.  
 Water-Pipe Tunnel, Metropolitan Water-Works.\* Beardsley Lawrence. (13) June 10.  
 Hydro-Electric Development at Fountain Falls, Ontario.\* (96) June 10.  
 Completion of Sooke Lake Waterworks System for Victoria, B. C. (96) June 10.  
 Failure of Small Earth Dam.\* George H. Ruhling. (13) June 10.  
 Irrigation in the Wenatchee Valley.\* Arthur Gunn. (27) June 12.  
 The System of the Montana Power Company.\* Max Hebgen. (27) June 12.  
 Concrete Rings Superimposed, Sunk to Form San Antonio Pump Pit.\* William Wren Hay. (14) June 12.  
 Austin's Hydroelectric Plant has Unusual Reinforced-Concrete Wheel Casings.\* (14) June 12.  
 Design Details of the Cincinnati High Pressure Fire System.\* (86) June 16.  
 Table of Circular and Horseshoe Conduit Sections.\* George Henry Ellis. (13) June 17.  
 Water Storage on Surface and Underground in Australia. J. T. N. Anderson. (Paper read before the Victorian Inst. of Engrs.) (96) June 17.

\* Illustrated.



2000

1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the study and the objectives of the research.

2. The second part of the report is a detailed description of the methodology used in the study. It includes information about the sample size, the data collection methods, and the statistical analysis techniques.

3. The third part of the report presents the results of the study. It includes a summary of the findings and a discussion of the implications of the results.

4. The fourth part of the report is a conclusion and a list of references. The conclusion summarizes the main findings of the study and provides a final statement on the research.

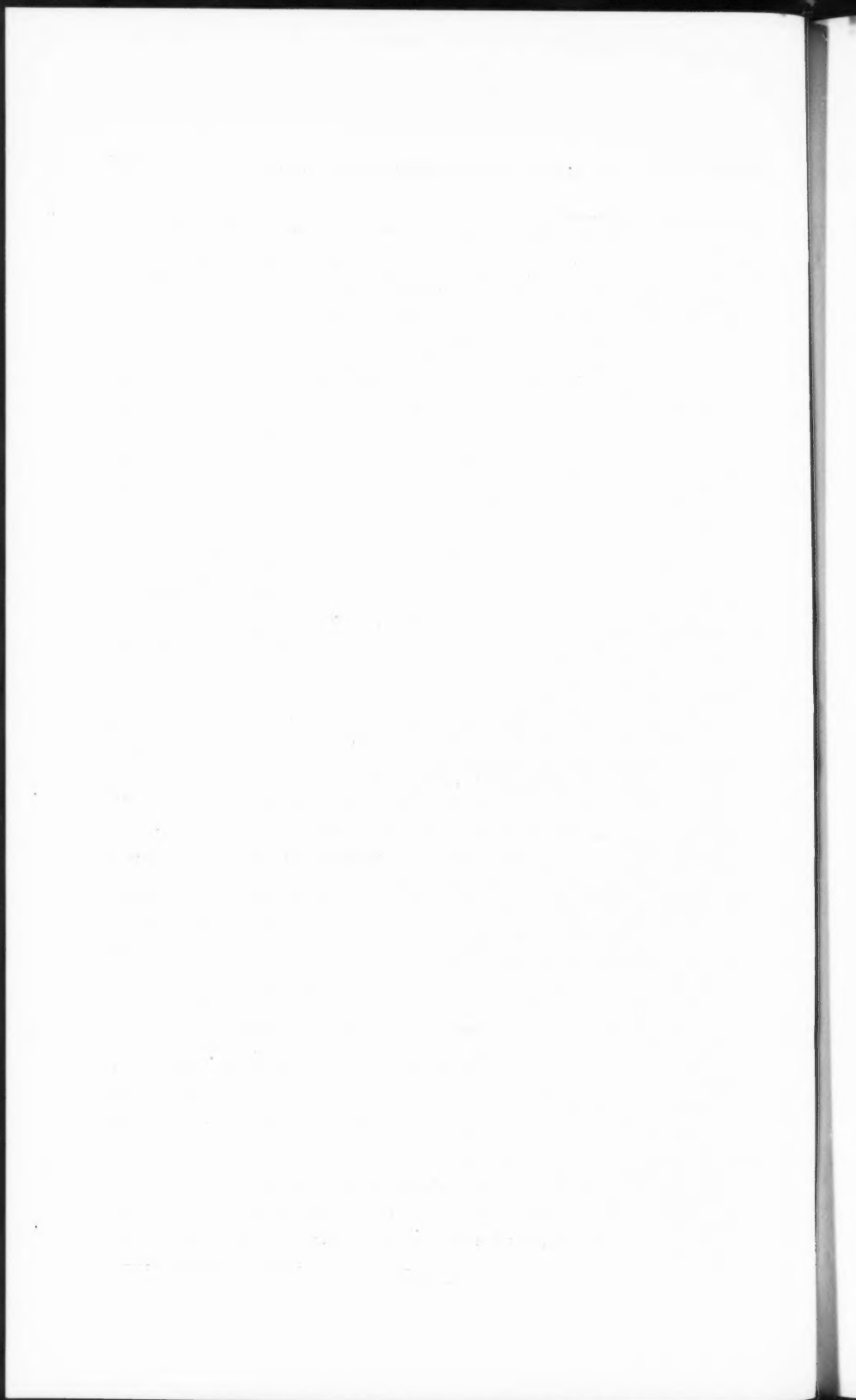
5. The fifth part of the report is a list of references. It includes a list of all the sources used in the study, including books, articles, and other documents.

6. The sixth part of the report is a list of appendices. It includes a list of all the additional materials that are included in the report, such as tables, figures, and other documents.

7. The seventh part of the report is a list of footnotes. It includes a list of all the footnotes that are included in the report, providing additional information on the study.

**Water Supply—(Continued).**

- Automatic Liquid-Chlorine Water Disinfecting Plant.\* James A. Newlands. (13) June 17.
- Flexible Bronze Tubing of the Partridge Island Pipe Line.\* (13) June 17.
- The Stripping of Gravel Pits by Hydraulic Methods.\* W. H. Wilms. (15) June 18.
- A 115 000-Volt, Hydroelectric System in Japan.\* (27) Serial beginning June 19; (111) July 3.
- Floods Top Unfinished Dam, Green Concrete Injured.\* Cyril Wigmore. (14) June 19.
- Analysis of Water Wheel Governor Effort.\* E. D. Searing. (Paper read before the National Elec. Light Assoc.) (111) June 19.
- Developments in the Marshall, Texas, Water Works in Recent Years. Ben F. Meyers. (Paper read before the Southwestern Water Works Assoc.) (86) June 23.
- The Steam-Turbine-Driven Centrifugal Pumps of the Toronto Water Works.\* (86) June 23.
- Construction Methods and Costs, Sacramento Valley Irrigation Project.\* P. A. Welty. (86) Serial beginning June 23.
- Relative Reliability of Long-Time Rainfall Observations.\* F. H. Millard. (13) June 24.
- Average Rainfall in the Light of the New Bedford Record.\* N. M. Stineman. (13) June 24.
- Hydro-Geological Conditions at Newbald, East Yorkshire.\* Percy Griffith. (104) June 25.
- Ashland Water-Rate Decisions Explained.\* W. E. Miller. (14) June 26.
- Data and Discussion on Leakage from Cast Iron Water Mains. Joseph W. Ivy. (Paper read before the Southwestern Water Works Assoc.) (86) June 30.
- Biochemical and Engineering Aspects of Sanitary Water Supply.\* George W. Fuller. (3) July.
- Construction Plant at the Nepaug Dam.\* (13) July 1.
- New Chittenden Plant of the Pittsford Power Co.\* Thomas Fraher. (13) July 1.
- Two Large Irrigation Projects in Russia.\* Milan Nikolitch, Assoc. M. Am. Soc. C. E. (13) Serial beginning July 1.
- Power Development at Iroquois Falls, Ont.\* (96) July 1.
- 7 000-Foot Pipe Line Floated to Place in Lake Ontario in Long Sections.\* N. Adelbert Brown. (14) July 3.
- Five 4-Foot Water Mains Underpinned After Break.\* (14) July 3.
- Federal Water Power Legislation. Henry J. Pierce. (111) Serial beginning July 3.
- Durability of Wood Pipe and Factors Affecting It. S. O. Jayne. (From *Bulletin* 155, U. S. Dept. of Agriculture.) (86) July 7.
- The Roman Aqueduct near Tarragona, Spain.\* John R. Rippey. (13) July 8.
- Hydrostatic Catenary Flume on a Concrete Aqueduct.\* H. B. Muckleston. (13) July 8.
- Modern Equipment in Detroit Athletic Club (Water Supply).\* (101) Serial beginning July 9.
- Disinfecting Large Public Water Supplies. Theodore Horton. (From *Health News*.) (101) July 9.
- Hydro-Electric Undertakings in Spain.\* (12) July 9.
- Why Drainage of Irrigated Lands is Necessary, and How the Problem is Handled.\* D. W. Murphy. (14) July 10.
- Cost of Electric Pumping for Irrigation.\* Barry Dibble. (Paper read before the Idaho Soc. of Engrs.) (27) July 10.
- Appearance Considered in German Water Towers.\* (From *Armierter Beton*.) (14) July 10.
- Bowl Outlets Reduce Velocities at Pipe-Line Ends.\* (14) July 10.
- Types and Properties of Deep Well Pumps. George W. Bissell. (Paper read before the Michigan Eng. Soc.) (86) July 14.
- Another Method of Constructing Logarithmic Charts for Hydraulic Formulas.\* (86) July 14.
- High Duty Obtained from Small Booster Pumps.\* (14) July 17.
- Subaqueous Pipe Taken up and Replaced 3 Feet Lower. Edmund M. Blake. (14) July 17.
- Ice Fighting is Systematized at Holtwood Hydroelectric Plant.\* F. A. Aliner. (14) July 17; (14) July 24.
- Large Irrigation Plants in the Columbia River Valley.\* Geo. D. Longmuir. (111) July 17.
- Handling Hydraulic Fill on Piute Dam.\* Joseph Jenson. (Abstract of report to State Engineer.) (14) July 17.
- Recommendations for Values of  $n$  for Different Kinds of Irrigation Channels.\* F. C. Scobey. (86) July 21.
- Determination of Rainfall Rates, Pawtucket, R. I.\* George A. Carpenter. (13) July 22.
- Tests of Frictional Resistance of Concrete on Shale (Dams).\* E. L. Lasier (13) July 22.



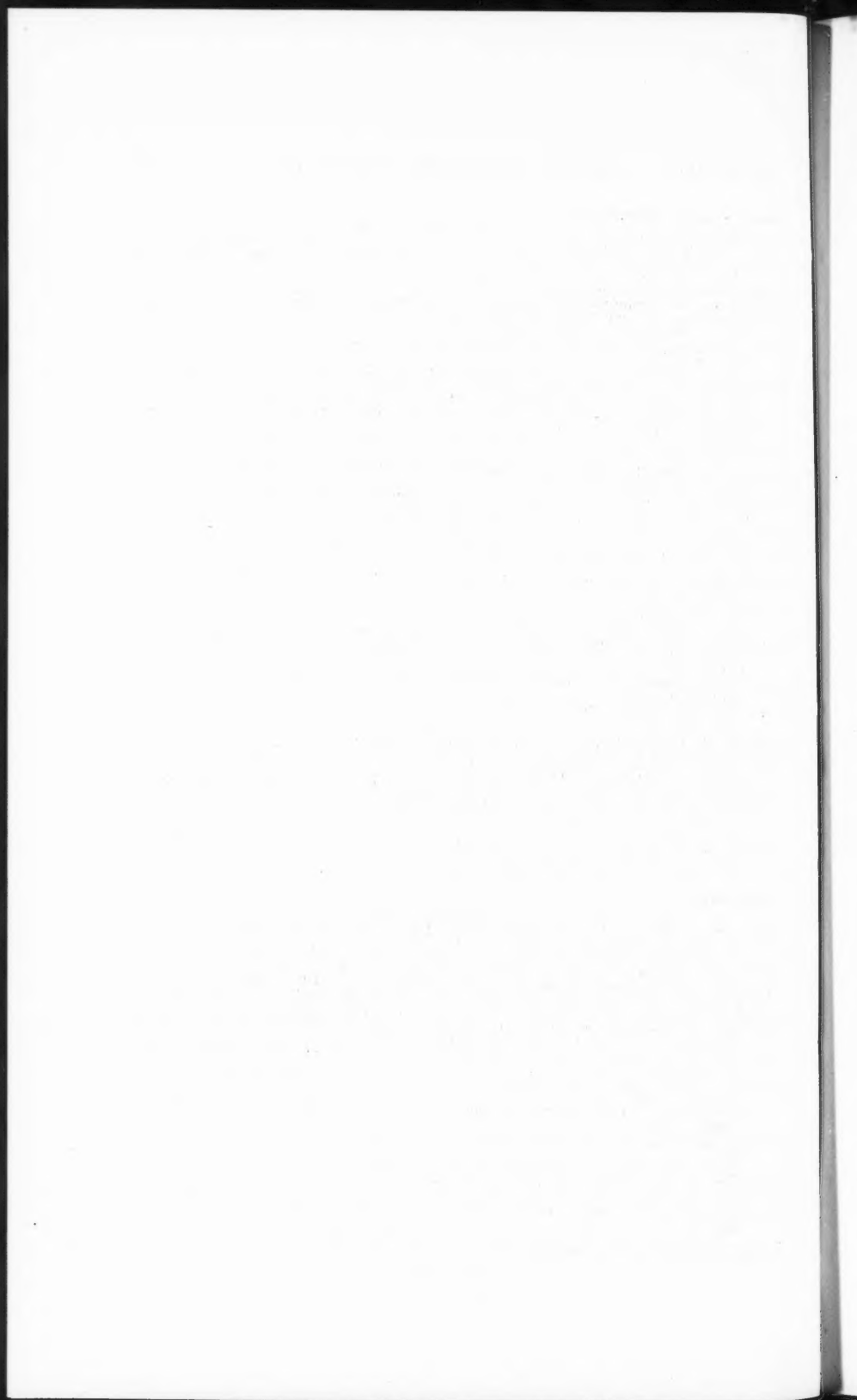
**Water Supply—(Continued).**

- Cleaning a Water-Supply Main at Merced, Calif.\* (13) July 22.  
 Water Supply and Drainage in Argentina. Albert Dale. (101) July 23.  
 Turbines Hydrauliques Horizontales de l'Usine Electrique de Capdella (Espagne).\* (33) Apr. 24.  
 Erfahrungen mit der Wünschelrute. H. Metzger. (7) Jan. 6.  
 Zum Gesetz der Grundwasserbewegung. J. J. Versluys. (112) Jan. 16.  
 Wasserversorgung und Typhusausbruch in Centralia, Washington.\* E. R. Kelley and S. Macomber. (112) Jan. 16.  
 Ueber Entgiftung bleihaltigen Leitungswassers durch das Berkefeld-Filter. J. Drost. (7) Jan. 23.  
 Strassenwasserstöcke zu Feuerlöschzwecken.\* Wendt. (40) Jan. 27.  
 Zur Ehrenrettung für das Darcysche Gesetz in seiner Anwendung auf die Bewegung des Grundwassers.\* M. Rother. (112) Serial beginning Feb. 1.  
 Allgemeine Vorarbeiten für die Erweiterung des Wasserwerks Gotenburg.\* J. G. Richert. (112) Feb. 1.  
 Verbindung einer Entsäuerungsanlage mit einer artesischen Quelle.\* G. Thiem. (112) Feb. 16.  
 Allgemeines über das Grundwasservorkommen in Frankreich. Ed. Imbeaux. (112) Serial beginning Feb. 16.  
 Untersuchungen über Verrostung von verzinkten Eisenrohren einer Warmwasserbereitungsanlage. Th. E. Meyer. (7) Feb. 20.  
 Die Bedeutung der Treibcrotte für die Wasserversorgung von Triest.\* Th. Schenkel. (112) Serial beginning Mar. 1.  
 Unterseeische Rohrlegung durch die Meerenge von Neuyork.\* Herzner. (112) Mar. 16.  
 Besprechung über den Bau und Betrieb von Heberleitungen.\* F. H. Schilling. (112) Mar. 16.  
 Einfluss der Grundwasserentziehung auf den Wald und seine Bewirtschaftung.\* Sinz. (112) Serial beginning Apr. 1.  
 Biologische Untersuchungsmethoden in Schwedischen Wasserwerken.\* (112) Apr. 1.  
 Die Geschichte der Wasserversorgung von Gallarate (Italien). Felice Poggi. (112) Apr. 1.  
 Die Notwendigkeit einer Enteisungsanlage. F. H. Schilling. (112) Serial beginning Apr. 16.  
 Das Wasserkraftwerk Refrain am Doubs.\* L. Kürsteiner. (107) Serial beginning Apr. 17.  
 Beitrag zur Theorie des äquivalenten Querschnittes. Alfred Fröhlich. (7) Apr. 24.  
 Ozonisierung des Pregelwassers in Königsberg i. Pr.\* Gg. Erlwein. (7) Apr. 24.  
 Elektrische Messung unterirdischer Strömungen in den Vereinigten Staaten.\* Charles S. Slichter. (112) May 1.  
 Die Versorgung der Orte am Suezkanal mit Wasser. G. Thiem. (112) May 1.  
 Die Berechnung von Kreisgewölbe-Schwergewichts-Sperrmauern gezeigt am Beispiel der Halligan-Sperrmauer am Cache la Poudre River, Colorado.\* Ziegler. (78) May 3.  
 Beitrag zur Frage der Stabilitätsbedingungen der Turbinenregler.\* Hans Baudisch. (53) Serial beginning May 28.  
 Beregnungsanlagen.\* P. Hartmann. (48) Serial beginning June 19.

**Waterways.**

- The Port of New Orleans.\* J. E. Edmond. (108) Apr.  
 Pile Driving With and Without the Water Jet. F. T. Parker. (Paper read before the Engrs. Club of St. Louis.) (1) Apr.  
 Automatic Sluices and Flood Gates.\* Henry Davey. (12) Apr. 23.  
 Hydraulic Plant for the King George Dock, Hull.\* (11) Apr. 30.  
 Alabama Coal Prospects (Lock 17 on Warrior River).\* (108) May.  
 The Proposed Lake Erie and Ohio River Canal.\* G. F. Stickney. (58) May.  
 Terminal Facilities at Savannah.\* F. F. Myers. (108) May.  
 The Flow of Sediment in the Mississippi River and Its Influence on the Slope and Discharge.\* C. McD. Townsend. (100) May.  
 The Port of Philadelphia and the Economic Development of Pennsylvania.\* Frank P. McKibben. (98) May.  
 The Rise of the Bed of the Yellow River by the Deposit of Sediment.\* William L. Sibert. (100) May.  
 A Recent Trip to Italy, Egypt, Southern France and Spain.\* Elmer L. Corthell. (100) May.  
 Locks and Dam No. 17, Black Warrior River, Alabama.\* H. C. Mower. (100) May.  
 An Electrically Operated Hydraulic Dredge.\* (13) May 6.  
 River-Front Improvement at Cape Girardeau, Mo.\* (13) May 6.  
 Plan for the Improvement of Hell Gate, East River.\* C. D. Ward. (46) May 8.  
 Methods and Cost of Levee Enlargement with a Tower Dragline Excavator.\* (86) May 12.  
 Slope Protection, New Welland Ship Canal.\* Eric P. Muntz. (96) May 13.  
 Lock Entrance Caisson, Panama Canal.\* (96) May 20.

\* Illustrated.



**Waterways—(Continued).**

- Welland Ship Canal Embankment.\* (96) May 20.  
 The Stability of Quay Walls on Earth Foundations. (96) May 20.  
 Work to Start in Deep Cofferdam for New York Pier.\* (14) May 22.  
 Connecting Idaho with the Sea.\* Fred W. Vincent. (46) May 22.  
 The Panama Canal and Its Electrical Equipment.\* John Liston. (98) June.  
 Hampton Roads as a Coal Harbor.\* (108) June.  
 Concrete Plant for Barge Canal Lock.\* (13) June 3.  
 Port Improvements along the Mississippi and Ohio Rivers. (13) June 3.  
 Drill Outfit for Light Blast Holes and for Rock Soundings.\* (14) June 5.  
 Transportation on Land and Sea.\* (46) June 5.  
 Unloading Chilean Ore by Great Lakes System.\* (82) June 5.  
 Beaumont Water Terminal Will be Built in Units; \$3 000 000 Development for Texas Port will Include Quay Sheds, Warehouses, Factory Lofts and Elaborate Transfer Machinery.\* H. McL. Harding. (14) June 5; (13) June 3; (86) May 19.  
 New Rating Flume for Current Meters, Bureau of Standards.\* (13) June 10.  
 Reinforced-Concrete Floating Caissons for the Welland Ship Canal.\* (13) June 10.  
 Toronto Harbor Improvement Project.\* (96) June 10.  
 The Pumping Station at the Gladstone Dock, Liverpool.\* (73) June 11.  
 River Improvement for Public Health Reclaims 10 000 Acres of Fertile Land.\* (14) June 12.  
 Progress of Montreal Harbor Development.\* (96) June 17.  
 Longest Municipal Pier in the United States is Nearing Completion at Chicago.\* (14) June 19.  
 Intercolonial Railway Pier 2 at Halifax Harbor, Nova Scotia.\* A. F. Dyer. (13) June 24.  
 One Huge Single-Lift Lock at Louisville will Guard the Entrance to the Portland Canal.\* (14) June 26.  
 Relative Duties of Federal and of State or Municipal Officials in Port Development. W. M. Black. (Paper read before the Nat. Assoc. of Port Authorities.) (100) July.  
 Vertically Framed Mitring Lock Gates.\* Malcolm Elliott, Assoc. M. Am. Soc. C. E. (100) July.  
 The Trinity River Survey. T. H. Jackson. (100) July.  
 An Interesting Pier Protection Problem.\* (23) July 2.  
 Compares Losses in Concrete and Mortar Lined Canals. (From *Reclamation Record*.) (14) July 3.  
 Government Wharf at Windsor, Ont.\* Hugo B. R. Craig. (96) July 8.  
 Mean Sea Level (Liverpool). (11) July 9.  
 Light Frames Support Reinforcement for High Retaining Wall.\* (14) July 10.  
 Design of Shore-Protection Works.\* Ralph Bennett. (13) July 15.  
 The Cost of the Erie Barge Canal. H. G. Moulton. (Abstract of paper from the *Journal of Political Economy*.) (15) July 16.  
 Severe Tests Show Chicago Municipal Pier to be Sound in Construction.\* (14) July 17.  
 Stepped Concrete River Wall at Harrisburg, Penn.\* Joel D. Justin. (13) July 22.  
 The April Floods in Texas. B. Bunnemeyer. (13) July 22.  
 Hunt's Point Terminal in New York Involves Difficult Bulkhead Construction.\* (14) July 24.  
 Concrete Lining Improves Sewage-Laden Creek.\* Joel D. Justin. (14) July 24.  
 Le Canal de Marseille au Rhone, Description des Travaux en Cours avec quelques Indications Relatives aux Voutes en Maçonnerie.\* M. Bourgoignon. (43) Nov., 1914.  
 Profil d'Empatement des Phares, Etude d'un Profil Elliptique.\* G. Debès. (33) Apr. 24.  
 Le Canal de Panama, Achèvement des Travaux et Résultats des Premiers Mois d'Exploitation.\* A. Dumas. (33) May 8.  
 Le Canal de Panama; Comparaison des Deux Systèmes de Jauge Nette qui y sont Appliqués avec la Jauge Dite de Suez.\* François Mange. (33) Serial beginning May 22.  
 Le Canal de Suez, Etat Actuel et Resultats d'Exploitation.\* A. Dumas. (33) June 19.  
 Die Entwicklung des Hafens Rügenwaldermünde.\* Th. Hoech. (49) Serial beginning Pt. 4.  
 Die Havelregulierungsbauten bei Brandenburg.\* Ostmann. (49) Pt. 4.  
 Die Wildbachverbauungen in der Schweiz.\* A. v. Morlot. (49) Pt. 4.  
 Erweiterung des Oder-Spree-Kanals.\* Ahlefeld. (40) Feb. 27.  
 Temperaturschwankungen und Oderhochwasser. Karl Fischer. (40) Mar. 24.  
 Neuere Kanalwasser-Reinigungsanlagen in England. (7) Apr. 17.  
 Die Verlängerung der Wienfusselwölbung und der Stadtbahneindeckung in der Strecke von der Leopoldsbücke bis zur Magdalenenbrücke.\* Martin Paul. (53) Serial beginning Apr. 23.  
 Der Panama-Kanal.\* O. Franzius. (48) Serial beginning May 22.  
 Geschwindigkeitsformel für Wasserläufe. Jaroslav Gröger. (53) June 18.

\* Illustrated.